The purpose of this study was to examine ways to support early childhood special education (ECSE) pre-service teachers in using responsive interaction (RI) language intervention strategies during practicum placements through the use of immediate feedback using bug-in-the-ear technology. The four research questions that guided this study were: (1) What benefits do the pre-service teachers perceive from using the bug-in-the-ear technology when receiving coaching during practicum? (2) What challenges do the pre-service teachers perceive from using the bug-in-the-ear technology in receiving coaching during practicum? (3) How does coaching affect pre-service teacher use of responsive interaction (RI) strategies? and (4) What changes in the target child’s communicative acts were observed through the course of this study?

This qualitative study used a symbolic interactionism (SI) approach. Findings from this study indicate that, overall, the pre-service teachers who participated in this study found BIE coaching to be valuable and helpful to them. However, participants described feeling overwhelmed at times with the process and the noise of the classroom affected the quality of the BIE feedback provided during some of the coaching sessions.
Moreover, there were some indicators that at least two of the pre-service teachers were able to apply some of the RI strategies independent of BIE coaching at the end of the study. Finally, mixed results were found in observations of how the target child’s communicative acts may have changed over the course of the study.

INDEX WORDS: bug-in-the-ear (BIE) technology, coaching, delayed feedback, immediate feedback, naturalistic language intervention, pre-service teachers, responsive interaction strategies, supervising teacher
PRE-SERVICE TEACHER INTERPRETATIONS: THE USE OF IMMEDIATE
FEEDBACK AND BUG-IN-THE-EAR TECHNOLOGY

by

LAURA SUZANNE MCCORKLE
B.S., Murray State University, 1997
M.S., Murray State University, 2001

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial
Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2017
PRE-SERVICE TEACHER INTERPRETATIONS: THE USE OF IMMEDIATE FEEDBACK AND BUG-IN-THE-EAR TECHNOLOGY

by

LAURA SUZANNE MCCORKLE

Major Professor: Cynthia O. Vail
Committee: Jennifer A. Brown
Janette Hill
Rebecca Lieberman-Betz

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
August 2017
DEDICATION

This dissertation is dedicated in memory of G.G. and Granddaddy,
and to four of my most favorite people ever – Gracie, Emma, Audrey, and Sammy – as you continue to grow, I hope that you receive as much as joy in your lives as you give to others.
ACKNOWLEDGEMENTS

TELL ME
Tell me I’m clever,
Tell me I’m kind,
Tell me I’m talented,
Tell me I’m cute,
Tell me I’m sensitive,
Graceful, and wise,
Tell me I’m perfect –
But tell me the truth.
- Shel Silverstein

In exploring the use of immediate feedback and coaching within a qualitative study, an ongoing theme has been “tell me ____.” At this point, there are a number of people I would like to thank for their ongoing encouragement, support, and wealth of knowledge.

First, I would like to thank my advisor, Dr. Cindy Vail, and other members of my committee, Dr. Janette Hill, Dr. Rebecca Lieberman-Betz, and Dr. Jennifer Brown for always having an open door, providing me with more opportunities to grow and develop than I can begin to list, and for serving as a model for me in how to support pre-service teachers, as well as graduate students, in the future.

Second, I would like to thank the pre-service teachers who participated in this study for telling me how they truly feel about BIE and being such a fun and positive group. Working with you was such a treat and so much fun - despite the background noise! Additionally, I want to express my gratitude to the classroom teachers, target children and their families, and administrators at the ELC, especially Bridget, for working with me and helping coordinate all the minor, but incredibly important details in completing my study.

Third, I would like to thank Dr. Ann Kaiser, Dr. Terry Hancock, and Dr. Juliann Woods for giving me my first opportunity to learn about coaching families and teachers and to learn about Enhanced Milieu Teaching through the KidTalk Tactics (KTTP) project. I can’t imagine what my life would have been like without this opportunity.

Fourth, I would like to thank my amazing network of friends, both old and new, for ongoing late-night phone calls, texts, and emails to make me laugh and telling me all sorts of funny and hysterical stories, as well as offering kind, honest, and supportive words of encouragement to keep me going.
Last, but not least, I would like to thank my family for their ongoing encouragement and support. Relationships in coaching are essential and I can’t imagine a stronger model of how to coach others and support students than what both my parents have provided for so many years. Thank you for all you have done for me before and during this journey!
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGEMENTS</th>
<th>v</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
</tbody>
</table>

## CHAPTER

1. **INTRODUCTION**

   - Rationale .................................................................................. 5
   - Purpose of Study ........................................................................ 6
   - Research Questions .................................................................... 6
   - Definitions ................................................................................. 7

2. **REVIEW OF THE LITERATURE**

   - Overview of Symbolic Interactionism (SI) .................................. 9
   - Overview of Coaching ................................................................... 12
   - Immediate Feedback ..................................................................... 15
   - Teachers/Early Intervention (EI) Providers in Classroom Settings and Coaching .................................................... 18
   - Immediate Feedback, Coaching, and Technology ............................ 19
   - Bug-in-the-ear (BIE) and Early Childhood (EC)/Early Childhood Special Education (ECSE) ............................................ 22
   - Conclusion .................................................................................. 33
### 3 RESEARCH DESIGN AND METHODS

- Overview .................................................................................................................. 37
- Qualitative Case Study Design .................................................................................. 37
- Context of the Study .................................................................................................. 42
- Sampling and Participant Selection ........................................................................... 43
- Diana and Jeffrey ......................................................................................................... 45
- Suzanne and Daniela .................................................................................................. 46
- Lily and Kendrick ........................................................................................................ 48
- Data Collection Methods ........................................................................................... 49
- Data Analysis .............................................................................................................. 55
- Researcher Bias and Assumptions .............................................................................. 60

### 4 Narratives

- Diana and Jeffrey ......................................................................................................... 66
- Suzanne and Daniela .................................................................................................... 79
- Lily and Kendrick ........................................................................................................ 93

### 5 RESULTS

- Understanding the Perspectives of Participants ...................................................... 109
- Research Question 1 ................................................................................................. 109
- Research Question 2 ................................................................................................. 113
- Research Question 3 ................................................................................................. 116
- Research Question 4 ................................................................................................. 122

### 6 DISCUSSION AND IMPLICATIONS

- Conclusions ................................................................................................................. 134
Study Limitations........................................................................................................137
Implications for Future Research.............................................................................140
REFERENCES .............................................................................................................143

APPENDICES

A Interview Guide........................................................................................................154
B Powerpoints............................................................................................................157
C Likert-Scale Questionnaire ....................................................................................163
D Transcription and Coding Guidelines ....................................................................166
E Consent Forms .........................................................................................................172
F IRB Approval Protocol .............................................................................................179
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2.1: Tenets of Symbolic Interactionism (SI)</td>
<td>10</td>
</tr>
<tr>
<td>Table 3.1: Overview of Participants</td>
<td>44</td>
</tr>
<tr>
<td>Table 4.1: Diana’s Ratings of BIE Before and After Use</td>
<td>77</td>
</tr>
<tr>
<td>Table 4.2: Suzanne’s Ratings of BIE Before and After Use</td>
<td>91</td>
</tr>
<tr>
<td>Table 4.3: Lily’s Ratings of BIE Before and After Use</td>
<td>104</td>
</tr>
<tr>
<td>Table 5.1: Qualitative Codes</td>
<td>109</td>
</tr>
<tr>
<td>Table 5.2: Diana’s Use of RI Strategies</td>
<td>118</td>
</tr>
<tr>
<td>Table 5.3: Lily’s Use of RI Strategies</td>
<td>119</td>
</tr>
<tr>
<td>Table 5.4: Pre-Service Teacher’s Ratings of BIE and Use of RI Strategies</td>
<td>120</td>
</tr>
<tr>
<td>Table 5.5: Jeffrey’s Communicative Acts</td>
<td>123</td>
</tr>
<tr>
<td>Table 5.6: Kendrick’s Communicative Acts</td>
<td>124</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

Bridging the gap between research and the implementation of best practices within the field of early childhood special education (ECSE) is a concern that warrants the attention and action required for children with exceptional needs and their families (Odom, 2009). This concern has been noted for practitioners working in Part C and Part B of the Individuals with Disabilities Education Act (IDEA), as well as teacher preparation programs (Raab & Dunst, 2004). Two factors compounding this concern are limited opportunities to apply evidence-based practices in real-life situations by preservice teachers and the ongoing attrition of special education teachers. Chang, Early, and Winton (2005) reported a high number of graduates from early childhood teacher preparation programs are leaving without having completed coursework or field placements in which they had opportunities to work with young children who have been identified as having developmental delays and/or disabilities.

According to Bornfreund (2011), a disparity exists between course content and pedagogy, along with an absence of clarity about student teaching and field experiences. Additionally, Stayton, Smith, Dietrich, and Bruder (2012) noted a lack of alignment between university curricula and professional association standards set forth in state policies. This practice lies in direct contrast to the supervised, reflective field experiences that are considered to be essential in preparing high quality educators (NAEYC, 2009). Moreover, during the 2015-2016 school year, at least 48 states reported a shortage of
special education teachers (U.S. Department of Education Office of Postsecondary
Education, August 2016). Consequently, a need exists for ongoing training and support
for new and experienced professionals working in ECSE programs.

Given the shortages of special education teachers for children age 3-5, colleges
and universities are experiencing an unusually high demand to prepare high-quality
teachers to meet the needs of these children (Boe, 2006). Critical to addressing these
shortages is the need for colleges and universities to have strong teacher education
programs. These programs are important as the education level of a classroom teacher
may influence a child’s behavioral, cognitive, and social outcomes (Norris, 2010).
Furthermore, a need exists for teacher preparation programs to focus on practices and
issues pertinent to children age 3 and under, with an emphasis placed on quality teacher-
child interactions that occur naturally throughout the child’s daily routines.

Although questions persist about the amount of coursework and practicum
experiences needed in coordinating a comprehensive teacher education program (Chang,
Early, & Winton, 2005), it is recognized that both are necessary for teachers to develop
the tools and confidence necessary to effectively implement instructional strategies.
Without these tools and confidence, concerns about the attrition of special education
teachers may continue. Therefore, the provision of high-quality practicum and student-
teacher experiences may prove to be essential in developing high-quality teachers in
ECSE programs.

Why aren’t teachers implementing practices that have been found to be effective?
One reason may be their lack of knowledge about best practices to use in their classrooms
(Odom, 2009). Horm, Hyson, and Winton (2013) put forth there is a need for research
about early childhood teacher education practices and that current research for this field has not yet made an impact on higher education policies and practices. When an educator obtains knowledge and applies best practices in his or her educational setting, one can reasonably assume that the educator has made an investment in learning about his/her field. With increased investments of learning and the application of best practices, some researchers have indicated the ongoing teacher shortage crisis may diminish. Connelly and Graham (2009) reported that when teachers gave a greater investment, they were less likely to leave than those who made a smaller investment. In summary, the ability of pre-service teachers to use evidence-based practices may indicate that both students and their supervisors have made a great investment in developing higher quality teaching skills.

Providing high-quality teachers with opportunities to practice the implementation of evidence-based practices in educational settings must be a priority while they are enrolled in their pre-service programs. Some concerns have been noted about whether or not this is actually happening. Scheeler, Ruhl, and McAfee (2004) proposed that pre-service teachers may not learn information pertinent to teaching in their classes, and, as a result, effective practices may not take place in real classrooms. Furthermore, some researchers have suggested that when teachers have more time to practice ineffective teaching strategies, these strategies become a habit (Goodman, Brady, Duffy, Scott, & Pollard, 2008; Scheeler, McKinnon, & Stout, 2012).

One way to guide pre-service teachers in the implementation of evidence-based strategies in a real classroom and eliminate any potential negative habits is through coaching. Rush, Shelden, and Hanft (2003) described coaching as an ongoing process that involves both observation and reflection. Moreover, when coaching teachers, the
coach supports the teacher’s capacity to assist their students in engaging and participating with others, as well as doing things the student is interested in and needs to do. Without live coaching, in which feedback is given to an adult while he/she interacts directly with a student, learning specific intervention strategies may be challenging.

During observations that take place between a supervising teacher and pre-service teacher, a primary goal is for the supervisor to provide feedback to the pre-service teacher on their use of instructional practices. Scheeler and colleagues put forth a number of findings in studies investigating the use of immediate feedback with pre-service teachers. In 2002, Scheeler and Lee noted the implementation of immediate feedback is especially relevant to working with pre-service teachers because it is widely considered that field placements may be the most important component of a teacher education program. Scheeler et al. (2004) reported that immediate feedback can be a more powerful way of eliminating incorrect or ineffective teaching strategies than using delayed feedback. Furthermore, they also observed that the use of immediate feedback by a supervisor maximizes opportunities for teaching as well as the modeling of effective instructional strategies.

One way in which immediate feedback can be provided is through “bug-in-ear” (BIE) technology. In order to use BIE, a pre-service teacher wears an earpiece (similar to a Bluetooth) and a supervising teacher or coach provides corrective feedback using a low voice in order to minimize disruption of the classroom routine and interactions between the pre-service teacher and her students (Goodman et al., 2008). Although BIE technology and immediate feedback have been used in a variety of contexts and classrooms (Scheeler et al., 2012), only four studies (Coole, Rahn, & Ottley, 2015;
Ottley, Coogle, & Rahn, 2015; Ottley, Coogle, Rahn, & Spear, 2016; Ottley & Hanline, 2014) reported the use of BIE technology with ECSE pre-service teachers. The use of BIE technology may allow pre-service teachers opportunities to receive the support they need for optimal teacher-child interactions. In turn, this could provide novice teachers with the evidence-based practices they may require in order to reduce turnover.

**Rationale**

Although there has been a strong record of success in effectively training parents on the use of *naturalistic language interventions* with their children, effectively training pre-school teachers has been much more difficult. In a pre-school classroom, there are several active bodies who require constant attention; having another adult in the room to coach a teacher during these interactions may be distracting to other students. By using BIE technology, only the classroom teacher would be able to hear the feedback he/she needs in order to effectively implement naturalistic language strategies and promote optimal language learning opportunities for all students.

As previously stated, a dearth of knowledge exists on the use of BIE technology with ECSE teachers. Consequently, a need exists to add to the base of knowledge about the effectiveness of immediate feedback via BIE for ECSE pre-service teachers and to produce high-quality teachers who implement evidence-based practices in classrooms and other natural environments. This study addressed both of these needs. Existing literature has used single-case design (SCD) in examining outcomes of these studies, as well as placed an emphasis on social validity that included qualitative data collection methods such as interviews, observations, document analyses, and questionnaires. Furthermore, due to the importance of providing high-quality learning opportunities to
students before they leave their university classrooms, practicum placements, and student-teaching placements, this training may be helpful in preventing or decreasing the attrition of special education teachers. Finally, this study blended an evidence-based practice for facilitating the communication development of young children with an evidence-based practice for adult learning.

**Purpose of Study**

For this study, the goal was to explore unique and effective ways to optimize learning opportunities during practicum placements while pre-service teachers engage in evidence-based practices with their students. The selection of which evidence-based intervention strategies to address while using BIE technology is important as we gauge the effectiveness of immediate feedback and monitor its effect on student learning. Therefore, the implementation of responsive interaction (RI) strategies (Kaiser & Hancock, 2003; Kaiser & Roberts, 2013) in practicum settings was a logical choice since a primary objective of pre-school teachers is to promote and facilitate communication development for all students. Finally, it was hypothesized, as a result of participation in this study, pre-service teachers would feel more empowered and confident in their teaching skills.

**Research Questions**

Four research questions were developed in this qualitative proposal. These questions were: (1) What benefits do the pre-service teachers perceive from using the bug-in-the-ear technology when receiving coaching during practicum? (2) What challenges do the pre-service teachers perceive from using the bug-in-the-technology in receiving coaching during practicum? (3) How does coaching affect pre-service teacher
use of responsive interaction (RI) strategies? and (4) What changes in the target child’s communicative acts were observed through the course of this study?

**Definitions**

**Immediate Feedback.** Feedback delivered within 3 seconds of a behavior (Scheeler, McKinnon, & Stout, 2012).

**Delayed Feedback.** Feedback that can occur at any time after the event occurs (Scheeler, et al., 2012; Elford, Carter, & Aronin, 2013).

**Bug-in-ear (BIE) Technology.** An earpiece used for the purposes of receiving corrective or reinforcing feedback (Goodman, Brady, Duffy, Scott, & Pollard, 2008).

**Naturalistic Language Intervention.** A conversational style of communication in which one communication partner intentionally and systematically models appropriate forms of communication and responds contingently to the communicative acts of their partner (Kaiser, Hancock, & Nietfeld, 2000).

**Responsive Interaction Strategies.** Communication strategies that may be used to support a child’s language development. Examples include: contingent responsiveness, language modeling at a child’s target level, and expansion of child utterances (Kaiser & Roberts, 2013).

**Coaching.** The iterative process of observation and reflection in which the coach promotes the learner’s ability to support the child in being and doing (Rush, Shelden, & Hanft, 2003).

**Pre-service Teachers.** College students currently enrolled in university courses who are preparing to be teachers of children with and without developmental
delays/disabilities from birth through kindergarten and are currently participating in practicum/student-teaching placements.

**Supervising Teacher.** Instructor or faculty member who serves as a mentor to students in practicum or student teaching placements.

**Overview of Chapters**

This dissertation is organized into six chapters. In Chapter 1, I presented a background of the problem, a rationale for the study, the purpose of the study, the research questions, and definitions for relevant terms. In Chapter 2, I provide the theoretical framework and review of literature for this study. The theoretical framework includes tenets of symbolic interactionism pertinent to this study. The review of literature has three separate components: an overview of key terminology involving coaching and immediate feedback, a discussion of the relationship between immediate feedback, coaching, and technology, and a review of studies that included the use of bug-in-the-ear technology. In Chapter 3, I describe the qualitative methodology used, philosophical framework, context of the study, participants, data collection and analysis, and discuss my researcher bias and assumptions. In Chapter 4, I present the results using a case study format for each participant dyad that details what happened during pre-intervention, intervention, and post data collection. In Chapter 5, I answer each of the four research questions. In Chapter 6, I provide an overview of the study, including connections made between tenets of symbolic interactionism and findings from this study, conclusions, study limitations, and implications for future research.
CHAPTER 2

REVIEW OF THE LITERATURE

Overview of Symbolic Interactionism

Within the scope of qualitative research, a researcher constructs rather than uses an established conceptual framework (Maxwell, 2013). In using this design, the researcher seeks understanding and brings her own set of interests and questions to the study. Additionally, the researcher becomes an observer within a setting or environment (Tavallaei & Talib, 2010). Currently, a small amount of research has been conducted on the use of BIE technology, particularly in early childhood settings. Research describing this process is needed in order to lay a foundation in developing this strategy, which could aid in the preparation of stronger teacher candidates.

Real settings were used in this study. Through this study, I sought to understand how coaching via BIE technology was interpreted by pre-service special education students placed in educational settings. Symbolic interactionism (SI) provided an appropriate lens to examine students’ perspectives and perceptions. A symbolic interactionist perspective is one in which the researcher strives to obtain a thorough understanding of social situations from the position and perspective of those individuals involved in that particular context (Blumer, 1969; Prasad, 2005). According to Prasad (2005), in relatively recent history, symbolic interactionists have reinstated the notion that language and interpretation are closely aligned; thus, the symbolic interactionist
perspective was particularly relevant for this study. Table 2.1 provides an overview depicting several significant tenets of SI and how it relates to this study.

<table>
<thead>
<tr>
<th>SI Tenet</th>
<th>Link to Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language and interpretation are closely aligned (Prasad, 2005)</td>
<td>Understanding the perspective of one another (between the coach and UGA pre-service teacher) and how to develop a rapport with one another.</td>
</tr>
<tr>
<td>When we interact with each other, we have to consider what our partner is getting ready to do or is already doing (Blumer, 1969).</td>
<td>UGA pre-service teacher responds to children’s play behavior and communicative acts with language salient to child’s play and communicative attempts. How the coach provides immediate feedback is based upon what the pre-service teacher is doing. Additionally, how the UGA pre-service teacher uses strategies based upon how the child communicates and what was said.</td>
</tr>
<tr>
<td>Interaction occurs between people rather than their roles (Adams &amp; Sydie, 2002).</td>
<td>Pre-service teachers focus on how to become a communication partner with their target child through the use of the RI strategies. In addition, immediate feedback is pertinent to the relationships between the coach and pre-service teacher.</td>
</tr>
<tr>
<td>Interpretation:</td>
<td>Use of target talk in modeling salient language as pre-service teachers promote language development. Also, the use of expansions as a language intervention strategy involves listening and adding on to the child’s language.</td>
</tr>
<tr>
<td>the “actor” realizes that things have meaning, and</td>
<td></td>
</tr>
<tr>
<td>the “actor” chooses, re-frames, and interprets meanings in reference to his/her context in a particular moment (Blumer, 1969).</td>
<td></td>
</tr>
</tbody>
</table>
Through the course of interacting with one another, individuals must be aware of each other’s actions and intentions. Due to the nature of this study, understanding how pre-service teachers perceived meaning through the interactions that occurred while receiving immediate feedback was relevant. As such, another symbolic interactionist tenet is appropriate: when we interact with each other, we have to consider what our partner is getting ready to do or is already doing (Blumer, 1969). This tenet is applicable on two levels in this study: (a) the coach provides immediate feedback based upon what the pre-service teacher is doing and (b) the pre-service teacher uses responsive interaction (RI) strategies (Kaiser & Roberts, 2013) based upon how a child communicates and what he/she says. Moreover, interactionism occurs between people rather than their roles (Adams & Sydie, 2002). With the implementation of RI strategies, the pre-service teacher is coached on how her interactions and communication may be meaningful in supporting the language development of her students.

The interpretation of our circumstances is considered a central focus of SI (Oliver, 2012). According to Blumer (1969), the two steps involved in interpretation are that: (a) the “actor” realizes that things have meanings, and (b) the “actor” chooses, re-frames, and interprets meanings in reference to her context in a particular moment. Thus, it was hypothesized the pre-service teacher would recognize meaning in seeing how her interactions affected the child’s language development within the natural context of a classroom. Through the process of learning to implement RI strategies, an additional symbolic interactionist tenet is appropriate: when we interact with each other, we have to consider what our partner is getting ready to do or is already doing (Blumer, 1969). Human beings are reflective (Gusfield, 2003; Meltzer, Petras, & Reynolds, 1975) and
understanding how participants in this study reflect and interpret coaching practices via BIE is important in gaining information on the effectiveness of this practice.

Another key feature found within the literature of symbolic interactionism is Blumer’s assertion of three premises of symbolic interactionism (Blumer, 1969). The first premise is individuals approach things according to the root of what those things hold for them. In this study, we investigated how pre-service teachers felt about the use of BIE technology and immediate feedback. What were their initial perceptions about BIE? The second premise is the approach one has for those things originates from social interactions an individual has with one’s companions. How social interactions occurred between the coach and pre-service teachers was critical to the success of using BIE technology and must be explored. The final premise is that meanings are held and adapted in an interpretative process employed by the individual in managing the things she encounters. Receiving immediate feedback through BIE technology while interacting with young children may be perceived as helpful or challenging and we need to examine why pre-service teachers may have either one of these responses in this style of coaching.

**Overview of Coaching**

The provision of immediate feedback in the field of early childhood special education (ECSE) may involve a process of providing support to educators and/or caregivers known as coaching. Coaching occurs in order to increase the level of skill one possesses (Showers, 1985). Shelden and Rush (2007) reported that coaching strategies have been used for the following purposes: (a) to teach new skills, (b) facilitate ongoing self-reflection and learning, and (c) improve current use of strategies and techniques. Coaching differs from other ways of providing support to educators and caregivers. Some
ways in which teachers have received support include the provision of information and 
workshop trainings (Casey & McWilliam, 2011). According to Rush, Shelden, and Hanft, 
(2003):

coaching is an interactive process of observation and reflection in which 
the coach promotes the learner’s ability to support the child in being and 
doing. For the child, coaching supports being with the people the child 
wants and needs to be with and doing what he wants and needs to do (p. 
34).

In relation to working with caregivers such as family members or early childhood 
special educators, coaching involves relational and participatory practices (Brown & 
Woods, 2016). As Israel, Carnahan, Snyder, and Williamson (2012) put forth, the process 
of coaching is ongoing, with an emphasis placed upon the relationships that occur 
between the teacher and coach. Within the context of ECSE programs, coaching can 
occur between a professional and parent, interventionists, a mentor/expert and teacher, or 
a university supervisor and pre-service teacher (Kretlow & Bartholomew, 2010).

Although the concept of coaching has garnered considerable attention in the field 
of early intervention (EI) and ECSE for a number of years, there is a need for clarity 
about the role and definition of coaching. During coaching interactions, the coach and 
trainee may engage in any or all of the following components during the coaching 
session: (a) observation, (b) practice, (c) reflection, (d) feedback, and (e) joint planning 
(Shelden & Rush, 2007). Kretlow and Bartholomew (2010) proposed that coaching 
involves a mentor or supervisor providing prompts and/or feedback to a teacher about 
how to effectively implement new strategies within a classroom environment. In a similar 
manner, Barton, Kinder, Casey, and Artman (2011) listed the following components as 
key in providing coaching: (a) formation of a professional relationship, (b) developing a
rapport between the coach and trainee, (c) provision of performance-based feedback, (d) identification of goals shared by both the coach and trainee, and (e) evaluation of progress made by trainee.

Positive outcomes have been noted regarding coaching in the field of ECSE. Rush et al. (2003) emphasized the partnerships and relationships that develop between team members, including both family members and child care providers, through coaching. As these relationships develop, team members are able to grow in their confidence and competence as they share their knowledge, skills, and experiences with one another. One benefit of coaching within classroom settings is that it allows the teacher to receive support and feedback as it relates to her particular classroom and instructional practices (Israel, Carnahan, Snyder, & Williamson, 2012).

Coaching in ECSE requires a team approach that incorporates the expertise and collaborative efforts of all team members. Powell, Steed, and Diamond (2010) stated that coaching teachers to use evidence-based practices in their classrooms may result in more significant and sustained improvements in their teaching practices when compared to more traditional methods of professional development such as workshops. Moreover, coaching advances knowledge gained from theories and principles, and applies it to the real challenges teachers encounter on a daily basis (Kretlow & Bartholomew, 2010).

Two ways of providing coaching with teachers are: (a) supervisory follow-up method and (b) side-by-side coaching method (Kretlow and Bartholomew, 2010). The supervisory follow-up method of coaching involves the expert observing a teacher as she practices implementing a newly learned strategy in her classroom. In this method, the expert notes the effectiveness of implementing the new strategy and provides feedback to
the teacher on strengths and suggested areas of improvement for ways to more effectively implement this strategy. In contrast, side-by-side coaching involves an expert teaching students in a real classroom alongside a teacher who is receiving training on how to use a specific strategy. With this style of coaching, the expert models how to implement the strategy with the students, provides an explanation of why the strategy was used, and allows the trainee opportunities to practice the strategy while receiving immediate feedback.

**Immediate Feedback**

Ways in which an adult interacts with a child are critical in helping to support a child’s acquisition of developmental skills. Therefore, the role of performance feedback for adults working with young children who may be at-risk for or have a developmental delay/disability can be important in helping the child develop stronger skills across all domains of development. *Performance feedback* has been described as information given to an individual about his or her behavior and/or use of instructional practices (Snyder, Hemmeter, & Fox, 2015). This information may be provided through verbal, written, or graphical feedback (Casey and McWilliam, 2011). The implementation of performance feedback, which has been employed to support effective instructional methods used by educators, has sparked some degree of interest in recent years as a way to provide professional development opportunities. In working with educators, two types of performance feedback are typically used: (a) recommendations for practice improvements, and (b) identification of instructional strategies correctly implemented (Powell & Diamond, 2013).
In providing performance feedback to teachers or family members, whether it is verbal or written, another important consideration to make is when the feedback occurs. The traditional method used by a mentor or supervising teacher, when coaching or supporting teachers, has involved the use of the plan-observe-conference cycle, with feedback occurring at the end of the lesson (Rock et al., 2009). Feedback provided to a teacher or other caregiver may be immediate or delayed. *Immediate feedback* has been defined as feedback that is given within seconds (Scheeler, McKinnon, & Stout, 2012) or moments of an act or behavior (Elford, Carter, & Aronin, 2013). In contrast, *delayed feedback*, which is the way that most pre-service teacher performance feedback is provided, can occur at any time after the event occurs (Scheeler, et al., 2012; Elford et al., 2013).

Over the past two decades, researchers have made comparisons between immediate and delayed feedback. Decisions about which type of feedback should be used are important in determining the most effective way to support teachers. In 1997, Coulter and Grossen reported that the use of immediate feedback is more effective and more efficient than delayed feedback as teachers acquired specific teaching behaviors more quickly. Furthermore, the teachers were able to make connections between their teaching practices and student behavior. Scheeler and Lee (2002) observed that some feedback may not be provided until days or weeks after an observation has been made, which makes the feedback less effective. More recently, Goodman, Brady, Duffy, Scott, and Pollard (2008) suggested that when delayed feedback is used, teachers are allowed opportunities to continue practicing ineffective teaching strategies; thus, poor implementation of teaching practices becomes even more ingrained.
Several benefits have been noted when immediate feedback is employed to promote increased use of effective instructional strategies. Scheeler, McKinnon, and Stout (2012) reported that when immediate feedback is provided, the teacher can make adjustments to any instructional strategies used incorrectly within that lesson instead of waiting until the next teaching opportunity to practice using those strategies correctly. Other benefits of using immediate feedback may include: (a) improvement in classroom climate, (b) use of more specific, descriptive praise with fewer reprimands, (c) implementation of research-based practices by the teacher, and (d) increases in students’ on-task behavior (Rock et al., 2009).

These findings have also been applied to explore the use of immediate feedback in supervising pre-service teachers. Scheeler and Lee (2002) stated that the implementation of immediate feedback is especially pertinent to working with pre-service teachers because it is widely considered that field placements may be the most important component of a teacher education program. Moreover, they proposed that supervisors of pre-service teachers play an important role in helping future educators effectively use instructional strategies. Similarly, Scheeler, Ruhl, and McAfee (2004) put forth that the use of immediate feedback by a supervisor maximizes opportunities for teaching, as well as the modeling of effective instructional strategies. Furthermore, Scheeler et al. (2012) suggested that if pre-service teachers are allowed to continue using incorrect teaching strategies, they may continue to use those strategies incorrectly when they have their own classrooms after graduation.

Although research supports the use of immediate feedback in working with teachers, when coaching occurs in a classroom setting, if a coach or mentor uses
immediate feedback to support a teacher who is leading a group of students, it can be very easy for the students to become distracted by interruptions made as feedback is provided during a lesson when the coach is in the room. Therefore, the use of technology, through which a coach can provide feedback to a teacher in a classroom without disrupting the natural flow of the lesson, may allow a teacher and class to experience benefits associated with immediate feedback and coaching.

**Teachers/EI Providers in Classroom Settings and Coaching**

Working in ECSE environments is unique in that the context provides opportunities for teachers to embed instructional strategies throughout everyday routines to a wide range of learners with individualized needs (Coogle, Rahn, & Ottley, 2015). Hemmeter, Hardy, Schnitz, Adams, and Kinder (2013) recommended that coaching may be more effective when it occurs at different times of the day in a variety of routines with specific instructions provided to teachers on how to apply strategies and instructional practices across activities. In consideration of designing and conducting a research study, coaching teachers in classroom settings is advantageous in that coaching can occur in ways that promote generalization across different contexts and routines. Some examples of ways coaching have been used in classroom settings will be provided.

Hemmeter et al. (2013) conducted a study addressing practices associated with the Pyramid Model that involved the use of a multiple probe design with teachers in blended preschool classrooms. Training sessions were provided to teachers prior to live coaching sessions, debriefing meetings, and through email feedback. The term immediate feedback was not used, but descriptions of the coaching process indicated that was the method of coaching used. All of the teachers who participated in this study increased the use of
targeted strategies, but there were mixed results of how their use of practices affected classroom behavior. Social validity was not available about teacher perceptions of different coaching practices.

Through the use of bug-in-the-ear (BIE) technology, which will be described later in this paper, Ottley and Hanline (2014) found that teachers of young children with special needs can benefit from coaching to promote effective use of communication strategies in working with children in their classroom. Similarly, Coogle, Rahn, and Ottley (2015) conducted a study working with three ECSE pre-service teachers using BIE technology. Their study indicated BIE coaching may be an effective way to increase the use of evidence-based strategies in ECSE environments. Furthermore, each of the pre-service teachers participating in this study reported positive feedback on the social validity measure used in this study. A more thorough description of these two studies will be provided later in this paper.

**Immediate Feedback, Coaching, and Technology**

As noted earlier, immediate feedback has been found to be an effective method of providing feedback to teachers, while coaching allows professionals the opportunity to address persistent concerns about transferring evidence-based practices into real-life situations. One way to use immediate feedback while coaching caregivers is through the use of a technological support known as “bug-in-the-ear” (BIE). Originally derived from clinical supervision at a psychotherapy department, BIE technology (or as they termed it “the mechanical third ear”) was used so that supervisors could provide immediate feedback to students, in order to help them avoid providing potentially harmful
treatments, regarding their interaction with patients during treatment sessions (Korner & Brown, 1951).

Although use of BIE began in the 1950’s, this method of supervision has been in use to support teaching practices for approximately 35 years (Elford et al., 2013). In 1995, Giebelhaus reported BIE technology was applicable to pre-service teachers in classroom settings and participants enjoyed the use of the BIE strategy. Through the use of BIE technology, a supervisor may unobtrusively provide feedback, using praise or corrective suggestions, without interrupting the flow of the activities or reducing the teacher’s credibility with his/her students as the lesson occurs (Giebelhaus, 1995). Based upon his research in using BIE devices with a pre-service teacher, Kahan (2002) also proposed that the use of BIE technology could be a valuable and effective way to mentor and supervise educators. In addition, it provides opportunities for corrections to be made at the moment instructional practices occur and provides a focus for conferences that occur after the observational session.

Research focusing on the use of BIE technology reveals some positive results. As noted earlier, BIE is a way of providing feedback in an immediate, but unobtrusive manner. This is key as one of the tenets associated with coaching is a supportive and collaborative relationship. Other research has suggested that the use of BIE technology in providing coaching to educators promotes increased use of evidence-based practices and minimizes use of any practices found to be ineffective (Ottley & Hanline, 2014).

During the time that BIE has been in existence, technology has changed dramatically. Although some changes have occurred over time, the basic premise of how BIE is used has remained the same in that the teacher or caregiver can hear feedback
provided by a mentor or coach, but may not always be able to verbally respond to the coach’s comments or suggestions. However, there is some variation in how this technology is employed with coaching. BIE can include the use of a two-way radio with an earpiece and microphone to allow teachers the opportunity to receive immediate feedback from a coach or mentor as they are teaching a class of students (Goodman et al., 2008). Two additional ways to use BIE have been described by Rock and her colleagues (2009). One method is through the use of Bluetooth technology and the other involved the use of virtual coaching via Skype within the classroom. When using the Bluetooth, a coach can call the teacher who answers with a Bluetooth and receive coaching during the training or intervention session. In using the Skype method, an off-site professional can Skype a classroom and provide immediate feedback to the teacher who is wearing a Bluetooth while providing instruction to her students.

As with all technology, pros and cons exist with the implementation of BIE technology. One benefit of using BIE technology is that feedback can be provided while the teacher is teaching/interacting directly with students or when there is silence in the room. When immediate feedback is provided in this method, the comments and feedback provided to the teacher will not disrupt or break the concentration of the students. Despite this advantage noted with immediate feedback and BIE, the following problems have been reported in using BIE technology: dropped calls, video and audio recording issues, firewalls, audio difficulties, lack of on-site technical support, and bandwidth limitations. Nevertheless, with an 84% or higher reliability rating to indicate how well the systems work (Rock et al. 2009), along with documented benefits about BIE and immediate feedback, efforts made to use this technological support should prove worthwhile.
As the body of literature has grown over time regarding the use of BIE technology, improvements in the application of BIE coaching strategies have led to better outcomes for pre-service teachers (Coogle et al., 2015). Just as importantly, in terms of promoting successful outcomes, individuals who receive immediate feedback and coaching through BIE technology have reported they enjoyed and valued this method of supervision. According to Rock et al. (2009), teachers described positive experiences they had regarding the use of BIE technology as a teaching and learning process. Similarly, Ottley and Hanline (2014) stated that the early childhood (EC) teachers in their study indicated that the use of BIE promoted their self-efficacy and helped them learn how to implement targeted strategies within classroom activities.

**BIE and EC/ECSE**

Although several studies have been used in providing coaching to teachers and pre-service teachers via BIE technology (Scheeler & Lee, 2002; Scheeler, Ruhl, & McAfee, 2004; Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler et al., 2012), relatively few have examined the use of bug-in-the-ear technology with young children who have developmental disabilities/diagnosed conditions. In 2014, Ottley and Hanline stated that only five studies have been published regarding coaching using BIE with young children with special needs. From those five studies, four used BIE with caregivers and one was with an EC educator. A brief overview of these studies will be provided.

Thomson et al. (1978) reported on teacher training techniques provided to preschool teachers. Participants in this study included both pre-service and practicing teachers of children age 3-5 years old. The teaching procedures used in instructing the teachers were: (a) written assignments, (b) graphical feedback, (c) immediate feedback.
via BIA technology, (d) observer feedback, and (e) self-counting. Feedback provided to the teachers focused on increasing targeted behaviors of their students. The coach and pre-service teacher reviewed behavior management strategies to be used with students and coaching sessions using BIE lasted 10-20 minutes. In this study, authors indicated that although BIE coaching was successful, concerns were expressed about the cost of the technology and negative teacher perceptions. The authors suggested that teachers were more likely to express negative perceptions about the use of the BIE technology if they believed they had acquired targeted skills and no longer needed the support provided with BIE coaching.

In 1984, Crimmins, Bradlyn, Lawrence, and Kelly conducted a study using BIE technology with a mother and her 4-year old son to address parenting skills that specifically focused on increasing the use of positive verbal statements and positive physical gestures. The mother was prompted through a microphone to a small remote receiver she wore in her ear. After 40 five-minute sessions, researchers began fading use of BIE technology. At a four-month follow-up visit, effects were maintained that indicated retained use of the strategies taught during the intervention.

Oliver (2009) conducted a dissertation in which three mothers of children diagnosed with autism spectrum disorder received coaching via a remote radio on ways to provide prompts and praise to their children. Results during the maintenance phase were positive in that mothers maintained use of these skills, and all children demonstrated increases in engagement, as well as increases in their ability to complete tasks and routines independently within their natural environments.
More recently, Puliafico, Comer, and Albano (2013) provided an overview of a training program designed to teach parents specific skills to decrease the child’s distress. Children who received treatment in this program typically range in age from age 3-7 years and have been diagnosed with child anxiety. Parents enrolled in this training program were taught to provide positive attending skills to their child (i.e., labeled praise, verbal reflections, imitation, behavioral descriptions, and enthusiasm) and then practiced these skills during intervention sessions in which a therapist coached the parent via BIE technology. As described in this manuscript, when parents were coached, transcript vignettes indicated the therapist provided more detailed feedback using multiple sentences instead of a short phrase to prompt the parent on how to interact with the child.

Over the past two years, in addition to Ottley and Hanline’s (2014) recent publication, three other studies have been published regarding the use of BIE within EI/ECSE settings (Coogle et al., 2015; Ottley, Coogle, & Rahn, 2015; Ottley, Coogle, Rahn, & Spear, 2016). In a study examining EC educators’ practices, in conjunction with toddlers’ expressive communication, Ottley and Hanline (2014) used a multiple-baseline design with four educator-child dyads at three inclusive EC centers. Children in this study were 24-35 months of age when the study began and had a diagnosed disability or developmental delay, along with an Individualized Family Service Plan (IFSP) that targeted expressive communication development. Research questions posed in this study included: (a) is there a functional relationship between the researcher’s use of immediate, specific feedback delivered to EC educators via BIE technology and the educator’s use of the communication strategies within play routines, (b) is there a relationship between the changes in EC teacher behaviors and the children’s expressive communication, (c) do EC
educators maintain the skills they learned when the BIE intervention is removed, and (d) do the EC educators think that the BIE is a socially valid intervention.

BIE technology used in this study consisted of two cell phones and Bluetooth. Coaching sessions were videotaped and a microphone was used near the educator-child dyad to capture communication exchanges. In addition, an ECHO smart pen audio-recorded coaching provided by the researcher to the teacher, as well as transcribed the anecdotal notes used by the researcher. Educators were provided a list of 10 communication strategies and chose three to target during coaching sessions. The Individualized Growth and Development Indicator-Early Communication Indicator (IGDI-ECI; 2001) was also used to collect pre/post data on children’s expressive communication. Finally, a social validity questionnaire was given to the educators to gather information regarding their perspectives on the availability and feasibility of BIE intervention.

During baseline, educator-child dyads were observed during small-group and indoor play without the use of BIE technology or coaching. In providing training about the communication strategies taught during intervention sessions, the researcher defined the communication strategy, described a rationale for why it was used, provided an example and non-example of its use, modeled how to use the strategy, and allowed the teacher the opportunity to role-play using the strategy until the teacher used the strategy correctly three times. All but one strategy selected by the educators focused on learning responsive interaction strategies; the other strategy focused on environmental arrangement. After this training, the teacher received BIE coaching while working with the target child. Coaching was provided in short 2-5 word phrases on ways to use the
strategy and praise for using the strategy correctly. At the conclusion of the coaching session, the researcher discussed how the coaching session went with the educator.

Upon conclusion of the intervention, social validity data revealed all of the educators enjoyed a variety of aspects about BIE coaching (e.g. reminds them to use the strategy, helped her know what to target, privacy in how the feedback was provided, and progress in children’s communication development). Two educators noted that BIE coaching was difficult to hear on days when the classroom was chaotic and noisy, but acknowledged benefits of being able to help children with developmental delays. Large effects were found in the educators’ ability to use wait time, offer choices, model language, and reinforce the child’s attempt to communicate. Variable outcomes were found in the educators’ ability to expand language, use contingent imitation, and follow the child’s lead.

When trained on a new strategy, all educators demonstrated decreases in the implementation of the previously taught communication strategy. One participant attributed this decrease to the extra focus she was making on implementing the new skill correctly. During the maintenance phase of this study, strategies that demonstrated a large improvement rate difference (IRD) over the course of the intervention were maintained; however, the use of coached communication strategies was at a rate lower than it had been at the end of the intervention phase. Two of the four children participating in the study demonstrated gains in their expressive communication; however, researchers observed this may be attributed to maturation. The other two children demonstrated gains, but the researchers noted overlapping data.
In a similar study, Coogle et al. (2015) examined the use of BIE coaching with pre-service ECSE teachers on their use of communication strategies within an activity-based framework, and explored two questions: (a) how does immediate feedback provided during field experiences via BIE eCoaching impact ECSE pre-service teachers’ use of communication strategies within an ABI framework, and (b) how do pre-service teachers rate the effectiveness of immediate feedback via BIE eCoaching in increasing their use of communication strategies. Participants in this study were three undergraduate ECSE pre-service teachers completing their student-teaching in inclusive preschool classrooms with children 4-5 years old. BIE coaching was provided while the pre-service teachers were facilitating small group activities. Each small group had at least one child diagnosed with autism spectrum disorder (ASD) and used either single- or two-word phrases.

A multiple-baseline, multiple-probe design study was used in this study and pre-service teachers were taught four communication strategies (i.e., choice making, in sight out of reach, sabotage, and wait time). Intervention sessions were video-recorded and an event-recording measure was used to code: (a) the frequency of prompts used, (b) the type of prompt used, (c) if the pre-service teacher responded to the prompt, and (d) the frequency in which the pre-service teacher used the strategy spontaneously. Upon completion of the study, the pre-service teachers were sent an online questionnaire developed to gather their perspectives on the effectiveness of using the intervention strategies, as well as the effectiveness of BIE eCoaching. Due to time restrictions, a maximum of eight sessions of intervention was provided to the pre-service teacher.
After completing baseline, training provided to the pre-service teacher included a narrated PowerPoint presentation that was accessed via Dropbox describing the communication strategies. BIE coaching lasted 10 minutes and included the following pieces of technology: a Swivel with an iPad which had a web-camera and Skype, and an ECamm and Evaer that simultaneously video-recorded the pre-service teacher and audio-recorded the researcher providing coaching. In addition, coaching occurred from a university or home office via Skype, and a Bluetooth device. Only one session was noted for experiencing difficulty with an internet connection.

Results from this study, as measured by PAND (percentage of all non-overlapping data) and Robust IRD, suggested a strong effect based on this intervention. According to responses gleaned from the online questionnaire in measuring social validity, pre-service teachers believed eCoaching was an effective way to change their instructional practices and improved the child’s communication skills. Generalization was measured and mixed results were found. One of the pre-service teachers did not demonstrate the use of the communication strategies when observed during circle time, but used the strategies during choice time. Two other pre-service teachers used these strategies during mealtime, choice time, and gross motor play.

In a paper that used qualitative analysis to examine how early childhood educators perceive the use of BIE coaching, Ottley, Coogle, and Rahn (2015) reviewed data collected from social validity measures obtained through two separate bug-in-ear coaching studies. These two studies, which took place in inclusive EC environments, explored the following questions: (a) how do early childhood educators describe the acceptability of BIE coaching, (b) how do EC educators describe the learning
opportunities experienced through BIE coaching, (c) how do EC educators perceive the feasibility of the BIE coaching process, (d) what difficulties do EC educators experience with regard to BIE coaching, and (e) how do EC educators perceive the usefulness of BIE coaching with respect to young children’s communication outcomes.

The first study included three undergraduate pre-service ECSE teachers who had only received delayed feedback prior to the onset of this study. Participants in this study were taught communication strategies via a PowerPoint presentation that took place after completing the baseline phase of the study. Immediate feedback and BIE coaching occurred through Skype for a duration of 10 minutes that took place twice a day over the course of 4 days. Data collection methods in this study included observations, interviews, and document analyses. Observations in this study were made by viewing the 10-minute video sessions of educators as they received BIE coaching. Semi-structured, open-ended interviews were used in this study and participants were given a list of interview questions they would be asked prior to the interview. Document analyses occurred by coding responses to a social-validity questionnaire.

The second study included four practicing EC educators in an Early Head Start or public EC center. Participants in the second study had varying educational backgrounds with a bachelor’s degree being the highest education level attained. Similar to the first study reviewed by Ottley et al. (2016), none of these participants had received BIE coaching. Coaching was provided face-to-face and focused on one instructional strategy per session. BIE coaching took place in 15 minute sessions for 3-5 days each week over the course of two months. Data collection in this study included observations and document analyses. Observations in this study were made by viewing the 3-minute video
sessions of educators as they received BIE coaching. Data analysis for this study was conducted from social validity questionnaires completed by participants to describe their perspectives of BIE coaching. Researchers in this study coded each open-ended question that was listed on the social validity questionnaire and completed by a participant in the study. All data in the research, which was obtained through interviews, observations, and answers to open-ended questions from the social validity questionnaires, were transcribed into Microsoft Excel document. Then, the responses were coded and recoded according to an iterative process consisting of: (a) open coding, (b) inter-rater reliability, (c) resolving disagreements, (d) pattern coding, (e) inter-rater reliability, and (f) resolving disagreements.

Findings from the research questions in this study indicated that EC educators believed BIE coaching was an effective way to improve their instructional abilities and children’s development. Furthermore, they did not perceive BIE as being intrusive in their interactions with young children and appreciated the degree of privacy involved with receiving immediate feedback via BIE technology. However, they did find it difficult to use when their classrooms were chaotic. Participants in these studies also valued the communication strategies they were implementing as a result of the coaching and stated they observed children responding to their use of the communication strategies. Overall, participants in both of these studies provided positive feedback about using BIE coaching and found it valuable for them and their students.

Researchers in this study observed that educators participating in this study appeared to have a good understanding of how to apply strategies they learned through the training within their classroom routines and noted educators generalized use of the
strategies into routines in which they had not received coaching. Moreover, researchers reported educators believed students progressed in developing skills that were not targeted within the intervention (e.g., vocabulary and social development). In addition, educators in this study viewed BIE coaching as less intrusive and invasive as they expected. Finally, educators stated they would use BIE again and saw value in receiving immediate feedback.

Using a multiple-baseline design, Ottley et al. (2016) conducted a peer coaching study via BIE technology with eight EC educators on ways to facilitate communication strategies (i.e. commenting, modeling language, providing wait time, imitating language, expanding language, and contingent reinforcement) with children age 6 weeks–3 years enrolled in a university-affiliated EC center. Two research questions were posed in this study: (a) does a peer-coaching professional development package improve EC teachers’ use of evidence-based communication strategies by at least three times their baseline performance, and (b) whether the outcomes were sustained over time by at least twice their baseline performance. Three communication strategies were targeted for each educator. Educational backgrounds of the teachers ranged from associate’s to master’s degrees. Social validity measures were collected through semi-structured interviews that took place 4 weeks after the maintenance phase ended.

Educators were video-recorded for 10 minutes during each phase of the study. BIE technology in this study changed from an initial use of walkie-talkie and push-button receivers to cell phones because two dyads had difficulty hearing feedback during coaching sessions. This study included three phases of professional development for the participants. In the first phase, all of the participants received a 90-minute training
session about communication development, the importance of child development, and coaching strategies. Within the portion of the training session that focused on peer coaching, participants were instructed to provide feedback through the use of a minimum of one prompt or praise per minute to their peer. Participants also had the opportunity to practice using BIE technology during the training session. In the second phase, participants were involved in BIE peer coaching that lasted 5-7 weeks. Additionally, a fading component took place to decrease how often professional development was provided for the teacher dyads. Plans for fading were varied according to each dyad.

During the third phase, participants began reflection sessions after the second week of intervention. The reflection sessions included a written portion that lasted 5-10 minutes and an oral reflection that lasted 20 minutes. In the written reflection, participants described: (a) how they implemented the communication strategies in the preceding week, (b) how the children responded to their use of the strategies, (c) experiences they had in using BIE peer coaching, and (d) their relationship with their peer coach. During the oral reflection session, the lead author probed teachers to facilitate a discussion about ways to use the strategies in order to lead to a deeper level of understanding about the intervention.

Results from this study indicated an immediate effect in the first two sessions for each of the four dyads once BIE coaching was implemented. However, findings were variable and not all of the dyads maintained use of communication strategies at a level that would be deemed as significant once coaching ceased. Two of the four dyads tripled their use of communication strategies from baseline to intervention and fading phase, and one dyad doubled their use of communication strategies from findings collected during
the baseline phase. During the maintenance phase, only two of the dyads demonstrated the ability to maintain their use of communication strategies at a rate of twice the level observed during baseline sessions. Social validity collected in this study indicated participants perceived BIE as an acceptable means of professional development, but noted some challenges (e.g., ensuring feedback was not redundant). Furthermore, they believed it improved their teaching abilities and their student’s communication development.

**Conclusion**

Although some research about how to operationalize and understand the constructs of immediate feedback and coaching has begun to emerge, only a minimal amount of research has been found about how this has been applied in working with teachers and pre-service teachers in early childhood classrooms. As the field of EI and ECSE attempts to move forward in bridging the gap between research and practice, some important points and recommendations should be considered. Coaching can occur at any time and can occur between any of the team members (Rush et al., 2003). While this study focused on immediate feedback between a university supervisor and three pre-service teachers, the use of BIE coaching could take place between an administrator and teacher or between teachers in a peer coaching model, such as the one described by Ottley et al (2016).

In addition to exploring how coaching can occur between different dyads, we need information about how teachers and pre-service teachers feel about the use of immediate feedback in coaching. We know from previous research how coaching should be provided (Mahoney et al., 1999; Kaiser & Hancock, 2003; Rush & Sheldon, 2005;
Rock et al., 2009), but know little regarding perceptions that currently exist from those who are receiving coaching. Therefore, continued research exploring ways in which the delivery of coaching strategies happens should be considered a necessary undertaking. Although social validity data were collected on several studies, quantitative research designs, specifically using single-case design studies, have been used in examining the use of BIE with pre-service and practicing EC/ECSE teachers. The development of a qualitative study to more closely examine teachers’ ongoing perceptions throughout the course of a BIE study could be useful.

Some similarities have emerged in summarizing the literature from previous studies using BIE with EC/ECSE pre-service and practicing teachers. One similarity involves the child’s age. The majority of the studies have been conducted with children over the age of three years old; only two of the studies reviewed about BIE and coaching pre-service or practicing teachers targeted children under the age of 2 years. Learning more about applying BIE with our youngest children is a worthwhile investigation.

This review of literature also focused on coaching used to target behavioral and communication strategies used with young children. While these strategies will always be a priority in supporting caregivers to facilitate language and the social-emotional development of young children, using BIE in working with children with a range of special needs would help expand the base of literature. Studies described in this review have included children diagnosed with expressive communication delays, ASD, and child anxiety. As a result, gaps in the literature exist in working with children with other types of diagnosed medical conditions, especially at ages under three years old.
In addition, some variability exists about coaching dosages. Most studies described coaching as lasting 10 minutes; however, one study described coaching that lasted 10-20 minutes. Gathering information from participants about their perceptions regarding how long coaching should last and how much feedback is enough, too much, or not enough are questions that need to be asked.

With such a small base of literature, we are still building the base of knowledge regarding routines in which BIE coaching has been provided. Studies in this review of literature described coaching during small group activities, with generalization occurring in mealtime, choice, and grow motor play. Examining BIE coaching in other routines such as free play, center-based instruction, or during a book routine could be useful in building the base of literature across different routines.

In summary, the review of literature has described ways in which BIE technology has evolved from the use of a reported “expensive” wireless radio system (Thomson, 1978) to a microphone and a small remote receiver (Crimmins, Bradlyn, Lawrence, & Kelly, 1984). As technology has progressed in the 21st century, a “bug-in-the-ear receiver” (Puliafico, Comer, & Albano, 2013, p. 519) has been used, as well as cell phones and Bluetooth, which were described in studies by Ottley and Hanline (2014). Therefore, this study added to the base of knowledge in using a cell phone and Bluetooth for BIE technology.

In the only study which focused solely on analyzing qualitative data, Ottley et al. (2015) stated researchers believed that educators were internalizing the strategies, but none of the studies in this review of literature have examined if this something early childhood/early childhood special educators are actually doing. The current study
extended this construct. Additionally, the current study examined how pre-service teachers make a shift from knowledge gained through course content to applications in a real settings.

In conclusion, although a base of evidence to support the use of immediate feedback and coaching is in existence, that base is still in very early stages. Coaching has been found to be an effective way to address needs of both caregivers and professionals. As we continue to build upon our base of knowledge, the inclusion of clear descriptions in how coaching is delivered is crucial in making improvements in this very important practice.

**Summary**

In this chapter, an overview of symbolic interactionism and its relevance to this study has been provided. A review of the literature about coaching, immediate feedback, and how bug-in-the-ear technology has been used with young children was discussed. Currently, a minimal amount of research has been conducted about the use of BIE technology in early childhood settings and this research has primarily focused on the use of quantitative data. Further, only three studies reviewed data collected from providing BIE feedback with pre-service teachers. The goal of this study was to address those gaps through examining perspectives of pre-service teachers in Early Head Start and Head Start practicum placements. Chapter 3 will discuss the research design and methods used in this study.
CHAPTER 3
RESEARCH DESIGN AND METHODS

Overview

This qualitative study addressed the need of preparing high-quality early childhood special educators (ECSE) through the use of bug-in-the-ear (BIE) technology in providing immediate feedback to pre-service teachers during practicum placements. Pre-service teachers were coached on the use of naturalistic language intervention strategies through the use of a Bluetooth headset while interacting with young children in their classrooms. Four research questions were developed in this qualitative study. These questions were: (1) What benefits do the pre-service teachers perceive from using the bug-in-the-ear technology when receiving coaching during practicum? (2) What challenges do the pre-service teachers perceive from using the bug-in-the-technology in receiving coaching during practicum? (3) How does coaching affect pre-service teacher use of responsive interaction (RI) strategies? and (4) What changes in the target child’s communicative acts were observed through the course of this study?

Qualitative Case Study Design

Qualitative research methodologies have been used to describe studies conducted in educational environments and about educational activities, including the context for the study, and how the study was interpreted by participants (Maxwell, 2012). Indeed, the use of qualitative approaches in research, especially in the field of education, is necessary in order to pinpoint specific factors and variables that may result in a particular outcome.
This study sought to obtain perceptions of pre-service teachers on the use of bug-in-the-ear technology to support them in facilitating the language development of young children as they were participating in practicum placements within early childhood classrooms.

**Case Study Design.** Case study is a method used in a variety of fields, including education (Yin, 2013). Moreover, case study research has historically played an important role in research focusing on work with young children. This design is also used to investigate contextual conditions, as well as decision-making and implementation processes. Case study has been described as a form of inquiry that examines situations as they occur in real-life settings (Yin, 1994). In addition, a case study design is considered an optimal way to conduct research in situations involving variables that a researcher is unable to control or manipulate. As this study investigated how pre-service teachers implemented naturalistic language intervention strategies within early childhood classrooms, the case study design was a logical choice.

Indeed, case studies are a preferred method when a researcher examines ‘how’ and ‘why’ questions and in real-life contexts. Thus, as this study examined how naturalistic language intervention strategies were implemented in an early childhood classroom, an explanatory case study method (Yin, 2012) was employed. In using an explanatory case study method, the researcher records and interprets a set of outcomes and attempts to explain factors that led to those outcomes.

Case studies are typically associated with process evaluations, as well as the documentation and analysis of outcomes of an intervention. Furthermore, this method permits the researcher to maintain pertinent features of the study as they occurred in
natural settings (Yin, 1994). Therefore, the use of an explanatory case study method in this study created a context to describe how the pre-service teachers perceived use of BIE feedback as they learned to implement naturalistic language intervention strategies in real settings.

A case study design employs a deep inquiry of a complex phenomenon, which may include systematic interviewing and direct observation, that occurs in natural or real-world environments (Yin, 2013). In using this inquiry, the researcher should investigate the probable interactions that took place between the case and the setting. One strength of using a case study is its capacity for incorporating a range of evidence. According to Yin (2012), the use of multiple pieces of evidence can be a contributing factor into the development of a good case study. Several pieces of evidence commonly associated with case studies, and used within the context of this study, include: (a) direct observations, (b) interviews, and (c) documents. However, it should be noted that precise and detailed observations, as a piece of the evidence, are not required in the use of case studies and only a small number of cases (Yin, 2013) are typically involved in case study design.

**Philosophical Framework.** In continuation to develop the framework for this study, the focus will now address the philosophical issues of ontology, epistemology, and axiology. Each of these may be defined, according to Greene and Hall (2010), as: (a) ontology – the nature of the social world we study, (b) epistemology – what counts as warranted knowledge, and (c) axiology – what is the nature and role of values in social inquiry. Additionally, the relevance of each of these philosophical issues to this study will be described in the following paragraphs.
The ontology of this study was particularly relevant since a primary focus of this study was to learn about the individual experiences of each pre-service teacher in using bug-in-the-ear technology. Therefore, it was critical to obtain their view of reality. Furthermore, as this study employed an interpretivist perspective and involved three pre-service teachers, I was interested in determining any similarities or differences that may exist between each of the pre-service teachers participating in this study. Thus, as an interpretivist seeks understanding instead of explanations, (Mack, 2010) in exploring qualitative aspects of this study, a focus on the social world of the pre-service teachers was important. At the onset of the study, I wanted to know what their thoughts were regarding the use of immediacy feedback and bug-in-the-ear technology. Although the primary researcher, myself, has thought about exploring this topic for quite a while, participants in this study had not, and gaining these perspectives was important in order to gauge any changes in their perspectives about the implementation of BIE technology during their practicum experiences.

The epistemology of this study was particularly relevant as I was also interested in how the teachers were acquiring knowledge of implementing RI strategies and feedback given to them during in their practicum settings. According to Mack (2010), epistemology is considered to be knowledge, which may be acquired through personal situations. Therefore, examining their experiences and concerns about using technology, being coached, as well as any previous knowledge about or experience in working in early childhood settings and naturalistic language interventions was an important part of this study. Any previous experiences with any of these variables could significantly affect
their perspectives on the implementation of immediacy feedback, as well as data obtained about their experiences participating in this study.

Axiology, also known as the study of values (Morgan, 2007), serves as a reminder for us to remember our role and how we should conduct ourselves. Axiology is a philosophy that may be used by researchers in forming their research questions and/or may acknowledge research reflexivity (Hesse-Biber, 2010) and/or critical subjectivity (Biddle & Schafft, 2015). As someone who has experienced live coaching, albeit without the use of BIE, I remember feeling a bit overwhelmed at times depending on the coaching style used. If the coach was calm and offered primarily encouraging, supportive statements, I was more relaxed and implemented the intervention with greater fidelity. Therefore, in using BIE technology, I endeavored to use this approach with our pre-service teachers.

It was also important to recognize that although this may be something I have comfort with, and although I believed I coached the pre-service teachers with a calm and encouraging approach, participants in this study may have perceived my style in a different manner. Therefore, I asked pre-service teachers to not hesitate to let me know if there was anything that I did that made them nervous or uncomfortable. Furthermore, pre-service teachers were reminded that if they did not want to participate in this study, they could withdraw or choose not to participate at any time. They also had the option of telling their academic advisor they wanted to end participation in the study if they felt uncomfortable telling me they no longer wanted to participate in the study. Finally, to help alleviate any other concerns, pre-service teachers were informed that participation in this study would not factor into grades they received for practicum. To further cement
this concept, a syllabus was given to students at the beginning of the semester, which detailed their practicum assignments and how they would be graded. Participation in this study was not considered part of the course assignment and did not affect their grade.

**Context of the Study**

This study took place at The Early Learning Center (ELC). ELC is part of the County School District and oversees several early childhood programs including Early Head Start, Head Start, public pre-k for 4-year olds, and a pre-school special education program (Early Learning Center, 2016). In addition to serving young children and their families, ELC has a partnership with a large, public university in the southeastern United States in which professional development and research studies take place. Three classrooms were used in this study; one was an Early Head Start classroom and the other two were Head Start Classrooms. Students in the Early Head Start classroom were 1-3 years old and students in the Head Start classroom were 3-4 years old.

**Birth through Kindergarten Program.** The Birth through Kindergarten program is a teacher preparation program at a large, public university in the southeastern United States. Undergraduate and graduate students participate in this program and have opportunities to receive funding through a federal grant if they commit to providing two-four years of teaching services in Part C or Part B preschool-kindergarten programs. However, it should be noted that none of the pre-service teachers who participated in this study received funding from this program. Graduates of this program are prepared to work with infants and toddlers, preschool age children, and children enrolled in kindergarten.
Curriculum. The curriculum for students in the Birth through Kindergarten program is based on evidence-based practices, and the Division of Early Childhood (DEC) and National Association for the Education of Young Children (NAEYC) standards. Each semester students enrolled in this program focus on a different age group of children and course assignments are linked to practicum experiences. Courses provided through participation in the Birth through Kindergarten program include: developmentally appropriate practices for young children, assessment, behavior management, methods and curricula in ECSE, curriculum for infants and toddlers, curriculum for 3 to 5 year olds, communication development, literacy instruction, and collaborating with families and teams.

Sampling and Participant Selection
A purposive sampling strategy (Maxwell, 2013; Teddlie & Yu, 2007) was used due to this study’s focus on the use of immediate feedback and BIE technology with pre-service teachers and students within their practicum setting. Maxwell (2013) reported five goals associated with purposive samples: (a) to obtain a typical representation of activities, settings, or individuals, (b) to obtain a range in variation of a population, (c) to choose participants pertinent in testing research theories for the study, (d) to develop parameters for making comparisons between participants or settings, and (e) to compile a group of participants in which you will best be able to answer research questions.

Pre-service teachers were students in the Birth through Kindergarten program at a large, public university in the southeastern United States. These pre-service teachers, three juniors enrolled in the Birth through Kindergarten program, participated in practicum placements at ELC, while also taking Communication and Language Development in Young Children (SPED 5160) in the spring semester. Pseudonyms were
chosen by each of the pre-service teachers and their backgrounds are provided; I chose pseudonyms for the target children in this study. An additional point which should be noted is that students enrolled within these inclusive classrooms should also be considered a purposive sample, as they are relevant to the study and goals (Maxwell, 2013; Teddlie & Yu, 2007). The cooperating teacher within the classroom and school administrators helped us identify which students should be targeted in this study.

Students were selected based upon the following recommendations: (a) the child did not have severe behavioral challenges, (b) the child might have some delays in communicative and/or cognitive development, and (c) parents were likely to complete paperwork needed for data collection in this study. Table 3.1 provides an overview of the participants.

Table 3.1
Overview of Participants

<table>
<thead>
<tr>
<th>Pre-Service Teacher</th>
<th>Target Child and Classroom</th>
<th>Coaching Experience</th>
<th>Exposure to Facilitating Language Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diana</td>
<td>Jeffrey (2 yrs, 7 mo.); EHS Classroom</td>
<td>Has coached new counselors at camp; University supervisor</td>
<td>SPED 5160</td>
</tr>
<tr>
<td>Suzanne</td>
<td>Daniela (3 yrs, 8 mo.); HS Classroom</td>
<td>Dance and Cross Country; Taught to lead church groups</td>
<td>SPED 5160; worked with SLP &amp; Speech Therapy Camp; ASL 1-3</td>
</tr>
<tr>
<td>Lily</td>
<td>Kendrick (3 yrs, 7 mo.); HS Classroom</td>
<td>University Supervisor; Played T-ball in elementary school</td>
<td>SPED 5160</td>
</tr>
</tbody>
</table>

Note. EHS = Early Head Start; HS = Head Start; SLP = Speech-Language Pathologist
**Diana and Jeffrey**

Diana is a 23-year-old junior in the Birth through Kindergarten program currently participating in her second practicum placement within this program. Her previous experience working with young children includes working at an outdoor summer camp for two summers with children in kindergarten and the first grade. Diana’s role at the summer camp involved direct interaction with the children and to provide coaching/mentoring to new counselors. She stated she did not receive specific training on how to be a coach, but felt it was instinctual.

In terms of her interactions with individuals who have developmental delays and/or disabilities, Diana has two cousins with diagnosed conditions. Both of the cousins are younger; one has a diagnosis of Spina Bifida and the other has a diagnosis of Autism Spectrum Disorder (ASD). At the time this study began, her educational and/or professional experiences regarding language development included current enrollment in the Communication and Language Development in Young Children (SPED 5160) course and hands-on experiences during practicum placements.

Prior to the onset of this study, Diana defined naturalistic language intervention as “if it’s naturalistic, it’s integrated into the day-to-day routine.” She also felt that providing an example would more adequately convey her perception of this term. “I guess when a kid’s holding a toy, like an apple or something, saying what is that and you kind of model stuff.” Diana reported that her only coaching experience had been provided by her university supervisor and that took place after observations of her teaching. Moreover, she had never used a Bluetooth prior to this study.
Jeffrey is 2 years, 7 months old and full of energy! He appeared happy and comfortable due to his smiles and laughter when playing with Diana. During my initial observation, he primarily communicated using words considered “others,” such as “yay” and “wow.” The volume of Jeffrey’s voice makes it easy to hear him and he loves playing ball, dancing, and playing with blocks/shape sorters. Many of Jeffrey’s verbal communicative acts are not clear and it is difficult to understand what he is trying to say.

**Suzanne and Daniela**

Suzanne is a 21-year-old junior in the Birth through Kindergarten program currently participating in her second practicum placement within this program. Her previous experiences working with children, in addition to having babysat and worked with children all of her life, include working in camp settings as a camp counselor for children in kindergarten and first grade, an afterschool program, and at a speech therapy camp. The camp for kindergarteners and first graders was a day camp with four counselors; children were able to swim and participate in large and small groups. Suzanne described the counselors as “most of us were pretty dominant in how we knew what we doing with kids, so it was a pretty good experience.” Suzanne’s experience at a speech therapy camp focused on shadowing a speech-language pathologist (SLP) who worked with children three-five years old who had mild speech disabilities and ASD.

In addition to working with children who had developmental delays and/or diagnosed conditions at the speech therapy camp, Suzanne has worked with children identified with Emotional Behavior Disorder, Attention Deficit Disorder, and a child in her practicum placement last semester was globally delayed. While working at the speech therapy camp, Suzanne reported that after she worked with a child, the SLP would make
suggestions to her about how she could work with the children. She was also able to observe the SLP in her sessions with children.

As she was growing up, Suzanne participated in soccer and dance and described these as positive coaching experiences. These experiences were described as positive because Suzanne does not consider herself to be athletically gifted, but her coaches were always encouraging. Additionally, Suzanne ran cross country in the seventh grade. Furthermore, Suzanne has been a small group leader for her church and received large group training on leading others. In this training, Suzanne stated she was “taught how to create a comfortable space for people to talk.”

At the onset of this study, Suzanne was enrolled in the Communication and Language Development in Young Children (SPED 5160) course, and had previously taken American Sign Language 1, 2, and 3 at this university. Finally, she had never used a Bluetooth prior to this study. When asked to define the term naturalistic language intervention before the intervention began, Suzanne defined the term as:

Whatever the child is talking about, that you enhance what they are saying. Like, if they’re saying just a part of a word, then you’d say the whole word or if they just say one thing, add on to what they are talking about, to give them more than what they’re using to expand upon.

Daniela is 3 years and 8 months old with big brown eyes and a sweet smile. Her voice is very quiet and impossible to hear amid the high volume of her classroom. She does not speak often in her classroom and enjoys playing with one or two other girls. During my observations she appeared to prefer the housekeeping center and playing with Legos during my observations. Although her teacher does not have concerns about her communication development, she was selected as the target child due to her reserved nature and limited expressive communication in this classroom.
Lily and Kendrick

Lily is a 21-year old junior enrolled in the Birth through Kindergarten program and is currently participating in her second practicum placement. Prior to entering this program, she had never been in an early childhood setting. When she was eight years old, she played T-ball and does not consider her coach to be a nice person. Other experiences with coaching included delayed feedback she received from her university supervisor after observations and on written assignments.

Lily’s interactions with individuals with developmental delays and/or diagnosed conditions involved her experiences participating in 4-H. Two children (at least 11 years old) in 4-H had a diagnosed medical condition; one had a diagnosis of Down Syndrome and the other had a diagnosis of ASD. At the time this study began, her educational and/or professional experiences regarding language development included current enrollment in the Communication and Language Development in Young Children (SPED 5160) course. Lily had never used a Bluetooth prior to this study. Prior to the implementation of the intervention, when asked to define the term naturalistic language intervention, Lily responded “I have no idea, sorry.”

When we were unable to obtain paperwork from a child in this classroom who exhibited some signs of delays in her communication skills, Kendrick was the child chosen by his teachers to be Lily’s target child. Kendrick is 3 years, 7 months old, entertaining, and reportedly likes to rap. He has an assertive personality and is very expressive in his communication style. Kendrick has a deep voice and it is not hard to hear him, but it can sometimes be difficult to understand him due to the volume of the class. He frequently uses gestures such as nodding his head and shrugging his shoulders
to communicate, along with multi-word phrases. His favorite play routine is to play with the babies in housekeeping; however, he will participate in other centers when he does not get his first choice in selecting centers.

**Data Collection Methods**

With an SI theoretical perspective, researchers interact with the participants, make observations and participate in their routines, facilitate interviews, and make sense of their reality (Charon, 2001). As noted earlier, a variety of techniques can be used for data collection; this study used qualitative and quantitative data (see Figure 1). The qualitative data in this study included: (a) semi-structured interviews (Rabionet, 2011; see Appendix A), (b) field notes (Maxwell, 2013), and (c) a research journal.

Although the focus of this study is on the use of immediate feedback via BIE, two components of coaching took place over the course of this study. In the first component, coaching consisted of the primary researcher meeting individually at the ELC with the pre-service teacher before and after each coaching session. These steps in the coaching process are known as “setting the stage” and “reflection and review” (Friedman & Woods, 2012; Friedman & Woods, 2017). Setting the stage is the initial step in the coaching process in which a coach collects updates from a teacher, as well as discusses routines and strategies that will be used during the coaching session. In the reflection and review phase of coaching, the dyad reviews what happened in the routine and the effectiveness of implementing the strategies (Friedman & Woods, 2015). The practice of “setting the stage” and “reflection and review” occurred before and after each coaching session using immediate feedback via BIE. All of the coaching sessions took place in
April, were audio-recorded, and transcribed. Copies of the transcripts were provided to the pre-service teacher for member-checking.

Both of these steps are integral parts of the coaching process associated with the relational aspects of the partnership between the coach and one being coached (Brown & Woods, 2016). These meetings involved conversations, which were audio-recorded and transcribed, regarding the use of immediate feedback via BIE, as well as the successes and suggestions on using the RI strategy in the future. On the day in which a new RI strategy was taught, the primary researcher described the concept of the language intervention strategy. A brief presentation (see Appendix B) describing the strategy was shared with the pre-service teacher. Examples and non-examples of this strategy were reviewed through role play before the pre-service teacher interacted with the child to practice this strategy.

The second, and primary component relied on the coach providing immediate feedback to the pre-service teacher via BIE technology. Each pre-service teacher received approximately twenty minutes of coaching per week on the use of a responsive interaction language strategy. As the pre-service teacher received coaching on three RI strategies (two sessions per strategy), they received BIE immediate feedback for a total of six coaching sessions. RI strategies were presented to the pre-service teacher in the following order: (a) mirroring and mapping, (b) target talk, and (c) expansions.

BIE technology used in this study was a M95 Plantronics Bluetooth Headset purchased for $62.48. The pre-service teachers agreed to let the primary researcher use their personal phone to call them on the headset. In this component of coaching, the coach called the pre-service teacher on the headset in the classroom and positioned
herself across the room where she could observe the interaction between the pre-service teacher and target child. Data collected for this component of coaching included field notes made in the researcher journal and interviews conducted with the pre-service teacher. Field notes were completed each day following a coaching session. After two sessions of implementing the RI strategy and receiving BIE feedback, a weekly interview took place at the ELC, was audio-recorded, and transcribed. Transcription and member-checking with the pre-service teacher for weekly interviews occurred within one week of each interview.

**Semi-structured interviews.** The use of interviews, in adopting a symbolic interactionist perspective, is prevalent as the researcher attempts to make sense of situations by asking how the participant views herself and others within the situation (Prasad, 2005). The perspective of each participant is important because we are able to find out what is true and authentic to that individual (Oliver, 2012). The previous work experiences and perspectives of pre-service teachers were described through the telling of their stories that were highlighted by excerpts from their transcripts, which maintain consistency of the narrative inquiry methodology (Polkinghorne, 1995).

In order to capture each pre-service teacher’s story, semi-structured interviews took place before and after the onset of the intervention, as well as after each of the three RI strategies were implemented in the classroom. The interviews took place at the school in a room apart from students and other distractions. An audio recorder was used to record interviews that took place with the pre-service teachers. Pre-service teachers were told that they did not have to answer a question if they felt uncomfortable and they could request to turn the recorder off for any reason. Interviews were transcribed and member-
checking was conducted to verify that pre-service teachers felt their statements were an accurate representation of their perceptions and they felt comfortable with their statements being shared with others.

**Research Journal.** A researcher journal was used to record field notes about observations made of the classroom environment, and other pertinent information (e.g. child or pre-service teacher illness, class disruptions during coaching, successes or concerns with BIE technology, etc.). The journal was used in conjunction with the interviews to re-construct the stories and put together a narrative detailing the experiences of the pre-service teachers and primary researcher in using BIE.

According to Holley and Colyar (2009), a narrative is how a story sequentially develops over time. It is often used to resolve how the story will be understood and comprehended by the readers. Moreover, narrative inquiry is a type of methodology that is often used by teachers and teacher educators in order to exchange new ideas, strategies, and skills (Hamilton, Smith, & Worthington, 2008). In narrative inquiry, the researcher explores continuity in the experience (what happened before the experience, what is happening now, and what will happen in the future; Butler-Kisber, 2010).

In using a narrative approach, the researcher uses elements of a story to help the reader understand the events he/she is attempting to describe. Hamilton, Smith, and Worthington (2008) noted that one characteristic found in narrative inquiry is the “identification of experience as story” (p. 24) and that the researcher follows the “process, experience, and progress of the work” (p. 24) when writing in the narrative inquiry approach. For example, the researcher becomes the storyteller, the participants are given the role of characters in the study, and the plot serves as a means to help the
reader understand the sequence of events in the story (Holley & Colyar, 2009). Further, a
narrative approach may explore individual and/or group narratives (Sandelowski, 1991).
Finally, narrative inquiries are sensitive to the needs, reactions, feelings, moral
dispositions, and desires of the self and other (Hamilton et al., 2008).

Although some concerns have been documented regarding the inclusion of
quantitative data in qualitative studies, several prominent researchers within the field of
qualitative research have suggested there is a place for numerical data when conducting
qualitative research (Maxwell, 2010). As previously noted, data collected within this
study primarily used traditional qualitative methods; however, the collection of
quantitative data was an important part of the data collection process. Quantitative data in
this study was used to develop and support the narrative of how BIE technology was used
to support pre-service teachers as they implemented RI strategies in their classroom. The
primary purpose of this study was to gather their perspectives about how they learned to
apply RI strategies in real settings; quantitative data helped describe any changes that
occurred through the use of these strategies. In collecting quantitative data, the following
measures were used: (a) Likert-scale questionnaires (see Appendix C) focused on pre-
service teacher perceptions of BIE feedback, how BIE helped with their communication
strategies, and their implementation of RI strategies and (b) descriptive statistics on the
use of RI strategies by the pre-service teacher and communicative acts demonstrated by
the target child.

Likert-scale questionnaires. Three questionnaires were used in this study and
adapted from a study conducted by Capizzi, Wehby, and Sandmel (2010). These
questionnaires were given to pre-service students prior to and after the intervention regarding their perceptions of BIE feedback.

Descriptive statistics. Prior to the onset of the intervention, pre-service teachers were videotaped for approximately 20 minutes wearing the headset without receiving feedback. Two of the target children and one of the pre-service teachers also wore a microphone in order to obtain higher quality audio due to noise level/interference of other voices in the classroom. Videos were transcribed and coded in order to gather data regarding how the target child communicated and how the pre-service teacher used any of the RI strategies before and after the intervention without receiving immediate feedback. The primary researcher and an undergraduate communication science student transcribed and coded the observations (see Appendix D). The variables coded for the pre-service teacher included: (a) use of mirroring and mapping strategies, (b) language modeled at the child’s target level, (c) the number of questions the pre-service teacher asked, and (d) the pre-service teacher’s use of expansions. To measure the target child’s communicative acts, the following variables were coded: (a) the number of communicative acts, (b) the number of play actions imitated by the pre-service teacher, (c) communicative acts below the child’s target level, (d) communicative acts that were not considered at the child’s target level, and (e) communicative acts at the child’s target level.

After obtaining IRB approval from the university and the local school system, pre-service teachers, parents, and EHS and HS classroom teachers signed permission forms (see Appendix E) for copies of the videos (or their own or their child’s image) to
be shared for educational and/or training purposes. These forms will be locked in a storage cabinet on campus for safekeeping for five years.

Semi-structured interviews were audio-recorded, and video recordings were uploaded and saved onto the desktop at UGA of the primary researcher. Assessment data from the questionnaires were also stored in a locked filing cabinet in a secure office on campus. Daily audio recordings from the semi-structured interviews were downloaded onto the desktop computer of the primary researcher. This office belongs solely to her and no one enters it without a key. Score sheets from the Likert-scale questionnaires were saved onto this computer, along with data from descriptive statistics, audio recordings, and transcripts obtained from the semi-structured interviews and pre-and post-video observations. After the completion of data collection, these data will be saved to the primary researcher’s advisor’s secure computer drive for five years to enable further analysis.

**Data Analysis**

In this study, pre-service teachers were videotaped in interactions with a target child during two observations prior to receiving coaching. Initial videos were observed, transcribed, and coded to determine strengths/areas of need in the pre-service teacher’s ability to facilitate language development, and obtain additional information regarding the target child’s current level of communication development. After completing pre-intervention data collection, coaching began with the use of the Bluetooth headset. Due to the complexity of using a camera, microphone, and coaching via the headset, data collected in the intervention phase of this study consisted of field notes and transcripts obtained from the semi-structured interviews.
In transcribing the interactions that occurred between the pre-service teacher and target child, an undergraduate communication student transcribed the majority of the pre- and post-sessions that were video-recorded. Due to difficulty in hearing and understanding communicative acts in a sometimes noisy, early childhood setting, the lead researcher reviewed each of these transcripts and made changes as needed. In transcription, the use of several gestures (head nod, point, reach, show, and take) were all transcribed if the participant’s body was clearly visible on screen depicting this form of communication. Additionally, if either the pre-service teacher or child said several sentences or questions, each sentence or question was considered a separate communicative act rather than a long communicative act. If the target child was playing and that play action was imitated by the pre-service teacher, both of those play actions were transcribed.

In coding the data for the pre-service teacher, once the session had been transcribed, the coder (both the undergraduate student or lead researcher) marked if the communicative acts of the pre-service teacher: (a) demonstrated use of the mirroring and mapping strategies, (b) were or were not at target level (if they were, a number was inserted in brackets to indicate which target was modeled), and (c) if the pre-service teacher was coded if she did or did not expand the child’s communication. Each of these codes had a specific letter that was placed in brackets next to the pre-service teacher’s communicative act. In addition, data were collected on the number of communicative acts made by the pre-service teacher and the number of questions she asked. Using event recording (Ayres & Ledford, 2014), the lead researcher counted the number of times each of these behaviors occurred during the observation.
Data coded on the communication level for the target child identified: (a) the number of communicative acts the child made, (b) the number of play actions imitated by the pre-service teacher, (c) communicative acts below the child’s target level, (d) communicative acts that were not considered targets, and (e) communicative acts at the child’s target level. Similar to coding used with the pre-service teacher’s data, the lead researcher used event recording to count the number of times these behaviors occurred. During pre-intervention, the lead researcher reviewed transcripts of the interactions that occurred between the target child and pre-service teacher. Using an Excel spreadsheet, the lead researcher categorized the child’s communicative acts into categories based upon parts of speech the child used and/or multi-word combinations the child used during the observations. Findings gleaned through this level of analysis were used in deciding how to select targets for the pre-service teacher to model during coaching sessions. The final level of analysis involved counting the frequency in which the target child made communicative acts, communicated at a level that was below or at his/her target level, used language that was not a target, and initiated play behaviors that were mirrored and mapped by his/her pre-service teacher.

The researcher journal contained field notes that were reviewed for any factors that may have affected outcomes, such as attendance, illness, etc. In order to analyze the semi-structured interviews, after transcription and member checking (Maxwell, 2013) were completed, coding focused on phrases that were used by pre-service teachers. Polkinghorne’s (1995) review of paradigmatic cognition was used as a guide in the coding process. Paradigmatic condition is defined as “a set of common attributes that is
shared by its members” (Polkinghorne, 1995, p. 10). Six steps are involved in coding and will be listed. These steps are as follows:

- construction or discovery of concepts that give categorical identity to the particulars and items in their collected data,
- testing the power to order the data,
- examine the data items for common themes and ideas,
- separate the data into groups of like items,
- a second level of analysis that identifies the relationships that hold between and among the established categories, and
- show how the categories link.

By analyzing data in this sequence, the primary researcher became very familiar with the data to put together elements of the story, which are characteristic of narrative inquiry regarding pre-service teachers’ perceptions about implementing BIE technology in an ECSE classroom. For this study, the researcher took the interview questions and rephrased them into codes. These codes were inserted then into an Excel spreadsheet that had columns for each pre-service teacher and rows for each of the codes. This allowed “testing of the power to order the data” so that data could be analyzed horizontally according to topic across the pre-service teachers or vertically to analyze how the pre-service teacher’s perspective may have changed over the course of the study. Data were examined for common themes both for the individual pre-service teacher on questions that were asked to them weekly and data were examined across participants for common themes and ideas.
Codes were then separated into groups of like items. For example, questions about language development and questions about feedback were grouped together. After the codes were separated, an additional level of analysis involved applying new codes across participants and through their own stories.

Each code was given a color and underlined on the spreadsheets. These codes were linked to identify how they addressed the research questions. For example, the codes about how using BIE may be beneficial were: (a) promotes awareness of needed changes, (b) amount and tone of feedback is key, (c) likes knowing what to do immediately, and (d) serves as a reminder for interactions throughout the day. Similarly, codes for challenges perceived by the pre-service teachers focused on: (a) background noise/technical issues, (b) concerns about other students needing attention, (c) feeling overwhelmed, and (d) concerns about student reactions to the pre-service teacher wearing the Bluetooth. Finally, in order to be coded, at least two of the three pre-service teachers provided responses that aligned with the codes in order to be included in this data analysis.

In terms of data analysis for quantitative methods, the researcher analyzed the pre-and post-intervention scores for the pre-and post-test results of the Likert-scale questionnaires and descriptive statistics. The total number of points on each questionnaire was tallied and comparisons were made for each of the pre-service teacher’s responses to the pre- and post-questions to determine if the pre-service teacher’s perception of BIE changed after participating in the study. Moreover, the third Likert scale questionnaire specifically asked questions about how BIE technology may have been helpful in the pre-service teacher’s implementation of the specific strategies; scores were tallied across
participants. Responses to this questionnaire were examined for each individual participant, as well as how the participants as a group responded to the questions. For example, as noted earlier, Diana moderately agreed or strongly agreed that the use of BIE technology and RI strategies were helpful. Upon examining these responses with the other participants, both Suzanne and Lily moderately agreed or strongly agreed with Diana that BIE technology helped them to use specific strategies but had different opinions than Diana on using BIE feedback.

Assessing Data Quality. In order to assess data quality in this study, four criteria were used to appraise the qualitative findings in this study (a) credibility, (b) transferability, (c) dependability, and (d) confirmability (Hannes, 2011). A focus on credibility was made through member-checking with the participants. Pre-service teachers reviewed copies of all transcripts obtained through the semi-structured interviews and copies of field notes pertaining to their coaching experiences. In addition, the pre-service teachers had the opportunities to review the narrative that described their coaching experience and target child. Transferability was addressed by providing details about the educational and professional backgrounds of the pre-service teachers and rich descriptions of the classroom settings. Dependability was assessed by documenting events of the study through the research journal. Finally, confirmability was addressed by providing a research bias and discussion of assumptions made prior to the onset of this study.

Researcher Bias and Assumptions

I worked in Early Intervention (EI) for approximately ten years prior to beginning work on my doctoral degree and am familiar with research supporting coaching and
feedback. During the last three years of my work in EI, while working directly with young children and their families on a project called KidTalk TACTICS (KTTP), I worked as a communication coach. As a communication coach, I provided immediate and delayed feedback on the use of language intervention strategies to parents, therapists and pre-school teachers for children ages 12 months through five years within a child’s natural environment at home and in childcare settings. The language intervention we used is called Enhanced Milieu Teaching (EMT). EMT (Trent, Kaiser, & Wolery, 2005) is a naturalistic language intervention that has been investigated in working with pre-school teachers and families of young children. It is a hybrid intervention that blends environmental arrangement strategies, responsive interaction strategies between a child and communication partner, and prompting strategies (Kaiser & Hester, 1994). Through this work, I had the opportunity to see benefits that families, providers, and children obtained through live coaching.

The opportunities I experienced while working on KTTP deepened my appreciation of using evidence-based practices in natural settings. At KTTP, we were fortunate in having expertise on facilitating communication development with young children and how to coach others to implement communication strategies. Through my training and experiences in coaching, I was able to witness firsthand how active reflection and immediate feedback provided while interacting with the child made the difference. However, while we observed changes in coaching parents in home settings, coaching teachers in classroom environments was much more challenging.

When I came to the University of Georgia, my work primarily focused on teaching and supporting undergraduate and graduate students who were participating in
practicum placements across a range of early childhood classrooms while enrolled in the Birth through Kindergarten program. Just as families and teachers in the KTTP project needed support in order to be successful at facilitating language development with their children and students, pre-service teachers also need support that comes through live coaching. However, coaching in classroom environments is hard. One day, while observing a student, the thought occurred to me that our pre-service teachers needed coaching in a way that could support them without distracting the students. Thus, the idea of BIE appealed to me. Due to the length of the semester, there is not time for pre-service teachers to learn all of the EMT strategies. Therefore, this study focused exclusively on three responsive interaction strategies.

Providing coaching to teachers and/or pre-service teachers while real children are present and able to hear feedback that their teacher is given can be distracting to everyone in the room. Moreover, most pre-service teachers have difficulty transferring knowledge gained through their courses to settings in which they are directly interacting with young children. As previously noted, some research suggests using BIE for pre-service teachers has been beneficial; however, only a minimal amount of literature in early childhood settings exists. Therefore, I wanted to examine how this would look in a real setting and get real perceptions of those receiving the coaching.

In my experiences as a graduate assistant at this university, I have been able to provide live coaching using immediate feedback with three students in the Birth through Kindergarten program. One involved working with a graduate student and a young child with special needs. In this situation, I sat in the classroom near the student-child dyad and provided live coaching. The other two coaching experiences took place last spring.
During the coaching opportunities, which took place in the spring, I used a Bluetooth headset to provide coaching in a classroom and playground setting with two undergraduate students in their student-teaching placements. All three students stated that they liked the live coaching and one stated she found it more efficient and effective in knowing how she was doing. (However, it should be acknowledged that all three of them may not have wanted to provide negative feedback to me since I was their supervisor and graded their assignments.) Therefore, I have had experiences that allowed me to see positive outcomes associated with live coaching.

**Trustworthiness**

Trustworthiness was addressed in several ways through the course of this study. Although this study lasted only three months, I was at the Early Learning Center almost every day during this timeframe. An ongoing presence at the setting where research is conducted aids a researcher in developing her observations and inferences (Maxwell, 2013). This ongoing contact allowed me to develop relationships with the pre-service teachers, classroom teachers, and target children involved in this study.

The collection of rich data through observations, interviews, and keeping a researcher journal helped me capture a more complete picture of how BIE technology can be used and interpreted in a classroom environment. Ongoing member-checks (Butler-Kisber, 2010) with the pre-service teachers were useful in verifying my interpretations. In addition, collaborating with an undergraduate communication science student with experience in coding, helped me more carefully consider how to code the data for descriptive statistics used in this study. Furthermore, the use of quantitative data helped strengthen findings (Maxwell, 2013) that coaching RI strategies via BIE technology may
have had an effect on the pre-service teachers’ use of language intervention strategies.

Finally, rich descriptions about the intervention process, data collection, and data analysis should assist in providing transparency about this study.
CHAPTER 4
NARRATIVES

In this chapter, descriptions of how this study evolved and the perceptions of the pre-service teachers’ use of bug-in-ear (BIE) technology are provided in the narratives. These narratives are taken from my field notes, excerpts from transcripts of conversations that occurred between the pre-service teacher and myself during interviews and “setting the stage” and “reflection and review” sessions, as well as transcript excerpts from interactions that occurred between the pre-service teacher and the target child. Furthermore, data collected from the field notes and the interviews provide information about how the child’s communicative acts may have changed during the course of this study. Additional data collected from Likert-scale questionnaires provide information regarding the pre-service teacher’s perceptions about the implementation of the language intervention strategies used in this study and their perceptions of using bug-in-the-ear (BIE) technology.

The chapter is organized in the following way. Each section represents a participant (n=3) in the study. Within each section, my initial perspective of each pre-service teacher and target child dyad are described first. In describing each dyad, I begin the narrative by sharing my first impressions of the pre-service teacher’s classroom, the pre-service teacher’s communicative style, and my impressions of the target child chosen for this study. After the review of the initial impressions, I describe what occurred during the coaching sessions for each dyad and factors that may have contributed to successes
and challenges of implementing the responsive interaction (RI) strategies using a Bluetooth headset as a form of BIE technology. (As previously noted, a M95 Plantronics Bluetooth Headset was the form of BIE technology used in this study. The terms “BIE,” “Bluetooth,” and “headset” may be used interchangeably in this document.) This is followed by the pre-service teachers’ perceptions about how the target child communicates and how her interactions with the target child are meaningful. Finally, I describe the post-observational session in which the pre-service teacher uses the RI strategies with the target child without receiving immediate feedback via BIE; additionally, the pre-service teachers’ final thoughts are shared, along with their pre-and post-data collected from the Likert-scale questionnaires.

**Diana and Jeffrey**

*My First Impressions of Diana, Jeffrey, and the Classroom*

When I enter the classroom where Diana is completing her second semester of practicum in the Birth to Kindergarten program, I see a kidney-shaped table with small chairs in front of me. To the immediate left of the door, I notice a restroom for the students. Next to the restroom is a sink surrounded by wooden cabinets. As I turn to my right, away from the front door, I see bookshelves in an L-shape with large cubby-holes to store paperwork and the students’ belongings. Just beyond these bookshelves, a small reading area, wooden storage cabinets, and a large area rug for circle-time are situated in the corner of the room. As my eyes follow the perimeter of the room, to the left of the circle time area, in the back, right corner of the room, another small bookshelf divides the room to set up a housekeeping area with a small table and chairs, toy kitchen appliances, and toys related to housekeeping (plastic foods, plates, cups, etc.). Continuing to follow
the perimeter, I see three small bookshelves that form as a sort of wall to separate a play area away from housekeeping, the open space near the reading nook, and the table used for art and meals. Interestingly, the back wall of the room does not rise all the way to the ceiling and there is a space of approximately six inches separating the top of the wall from the ceiling.

Nine people are in the classroom today: two co-teachers, Diana; another UGA student conducting research for an additional study in this classroom; and five students (all under the age of 3 years old). Despite this busy environment with extra people and two video cameras recording interactions between students and teachers, the lead teacher is smiling, which helps to create an environment for everyone to feel welcome. It is center-time and this is my third interaction with Diana. Previous meetings took place to introduce myself to this cohort of juniors within the Birth-Kindergarten program to explain this study and obtain consent, as well as to complete an initial interview on Diana’s perceptions of this study. As I set up my camera, Diana and I discuss that she should play with the target child, Jeffrey, as she normally would. She put on the headset and began to play with Jeffrey.

Diana and Jeffrey set up their toys on top of the bookshelf closest to the kidney-shaped table. They begin playing with a cylinder-shaped toy in which a different shape is dropped into the toy and it slides slowly to the bottom through a clear tube. Play consists of Jeffrey dropping shapes into the toy and Diana assisting by pointing to where he should drop the shape. She smiles frequently and appears to enjoy interacting with him. Most of the communicative turns between this dyad are hers; however, there are pauses in which there are opportunities for Jeffrey to communicate. Periodically, during the play,
Jeffrey moves the toy away from Diana rather than keeping it between the two of them so they both could play. Diana indicates she is interested in playing with Jeffrey by remaining on his eye level and talking about what he is doing. She also asks him questions to learn more about his understanding of colors, find out what he wants to do, and makes comments on his actions.

Diana: It came out.
Jeffrey: XX.
Diana: Red, yellow and blue.
Diana: Yellow and blue (points to yellow toy first then the blue toy).
Diana: Can you get the yellow one in?
Diana: There you go.
Diana: Yellow square.
Jeffrey: X all the way!
Diana: yay!

For the most part, Diana and Jeffrey are free to play uninterrupted by the other children; however, a couple of students in the classroom are interested in my camera. The minimum number of children interrupting the play between Diana and Jeffrey may be attributed to the high adult-child ratio today and that all children were receiving attention from adults.

Many of Jeffrey’s communicative acts are not clear and it is difficult to understand what he is trying to say. Jeffrey is curious and notices the headset that Diana is wearing. Diana’s hair is pulled back in a ponytail and it is obvious that she has something attached to her ear. As he reaches and tries to remove the headset from
Diana’s ear, he says “right here.” Diana is quickly able to retrieve it and put it back in place. She re-directs him by saying “it stays there” and they begin a play scheme with shapes in which Diana puts one to Jeffrey’s ear to pretend it’s a phone. She asks if he can hear and Jeffrey responds by saying “hello” and, eventually, “bye-bye” after a couple of communicative turns between this communication dyad. A significant difference exists between the number of communicative acts demonstrated by Diana and Jeffrey. Communication that Jeffrey demonstrates during the observations indicates he is a child who could benefit from extra support for his language development, making him an ideal child for this study.

**Diana’s Initial Impressions**

Diana’s initial impressions of Jeffrey focused on the form of communication he used, his ability to transition, and his level of independence. “He uses a lot of sounds… we haven’t heard a lot of words from him, but we can sometimes figure out what he is trying to say and he can repeat things to us.” Diana put forth that transitions are not easy; Jeffrey falls out on the floor when asked to do something different than what he expected, and he is independent. She also anticipated that the headset “will be interesting” and “it’s not really anything I have, like, seen before… it will be fun and new.” In addition, in paraphrasing her, Diana admitted to being a bit nervous about this adventure. Finally, prior to beginning the implementation of the study, Diana was asked to complete a survey regarding pre-perceptions on using BIE feedback. This survey contained ten statements and pre-service teachers were asked to rank if they strongly disagreed, moderately agreed, or strongly agreed with each statement. Diana reported that she strongly agreed with all but two of the statements; therefore, her total score at the onset of the study was
28/30. Areas in which she moderately agreed about using bug-in-the-ear feedback related to how it would enhance her effectiveness as a teacher and if it would be helpful in promoting language development.

**Implementing the Intervention**

After my three days of observing Diana and Jeffrey’s interactions in the classroom, we move on to implement responsive interaction strategies. I recently presented an hour and a half long presentation on Enhanced Milieu Teaching (EMT). This presentation took place in the language course Diana is taking this semester and contained videos describing how parents and classroom teachers applied the strategies, as well as how I had coached a parent in his home on the use of EMT strategies. Diana shares that she found this presentation interesting and wanted to try it.

**Implementing Mirroring and Mapping**

Diana is easy to talk to when we meet to “set the stage” for the coaching. It’s our first day and there are storms outside. We talk about how this is throwing the schedule off, but she is not rattled by storms and laughs frequently during our conversation as we discuss strategies and practice using them before we go into the classroom. This first day we are focusing on mirroring and mapping. I use Diana’s phone to call her on the headset and our first coaching via Bluetooth has begun. As Jeffrey and his classmates are seated at the kidney-shaped table for an art activity with markers and construction paper, I remain in the room but am near the housekeeping center directly across from them. Diana appears receptive to my feedback and will sometimes nod her head or look across the room as I provide a suggestion. Following Jeffrey’s lead and imitating his actions come very naturally to her. During this coaching session, Jeffrey takes markers in and out of
the container. Acting as a mime, when Jeffrey removes a marker from the container, Diana imitates him, and provides a label to this action.

Similar to my first observation, Jeffrey keeps materials close by, they are not easily accessible to Diana, and his body has turned away from her. I coach Diana to move the container between the two of them in hopes of encouraging them to face one another. This creates a situation for them to more easily connect and interact with one another.

After a few minutes of the art activity, students move on to free-play and Jeffrey wants to play ball. Diana is coached that when Jeffrey throws the ball, she should throw it back to him and says “throw ball.” She is also told that she should alternate in just imitating his actions to allow him the opportunity to initiate saying “throw,” “ball,” or even “throw ball.” Diana seems comfortable, based upon my interpretation that her facial expression looks relaxed and unstressed, with the feedback given to her.

On the second day of implementing the mirroring and mapping strategy, Jeffrey wants to play with cars and small balls. Learning to apply this strategy with a different toy is more challenging and Diana is coached to make sure she stays within proximity to Jeffrey, how to add onto the play by placing beads on the car, and to make sure she places her toys right next to his to encourage a closer connection with Jeffrey. Jeffrey is on the move during this session and went from one end of the room to the other. As he moves around the room, Diana requires coaching to serve as a reminder she needed to stay in close proximity to him. As I am coaching them, I am thinking that even though our focus is on responsive interaction strategies, another component of EMT, environmental arrangement is a key strategy that pre-service teachers need to learn.
**Diana’s Perceptions after Implementation of Mirroring and Mapping**

As the first week of intervention concludes, Diana indicates that Jeffrey is using more words and is pleased with his progress. “He said ‘thank you’ a lot today. It’s really exciting.” She also reports that his communicative acts sound “more like real words instead of like noise.” This week, Diana notices that Jeffrey appears more intentional with his communication and she is putting forth a greater effort to understand him. “Even if it’s not something we understand, it’s something we can tell, it’s something he wants to understand, and it has a reason behind it.” Furthermore, Diana shares that she and the other teachers in the classroom are having conversations about what they hear Jeffrey say. According to Diana, the interactions that occur between Diana and Jeffrey may be meaningful. “Whenever we’re playing, he will say something I can tell is something that he’s saying directly to me and it has some sort of meaning to him.” She believes he is intentional in his communication, that she is developing a stronger ability to understand him more, and growth is occurring. Finally, Diana indicates her interactions may affect his language development due to the casual nature of their interactions, stating “If he doesn’t, like, imitate first what I am doing every single time that is fine because he doesn’t have to. But he is doing that more and more and he is trying new words more and more.”

**Implementing Target Talk**

Moving on to implement the target talk strategy provides us with the opportunity to discuss how to select targets for a child. After being shown an Excel spreadsheet depicting words that Jeffrey uses, along with a copy of the MacArthur-Bates Communication Development Inventory (MB-CDI; Fenson, Marchman, Thal, Dale,
Reznik, & Bates, 2007), Diana notices that Jeffrey primarily uses one-word phrases to communicate and guesses that 2-3 word targets would be appropriate. In the first session focusing on target talk, Diana is told she needs to model a noun, verb, protoverb (a preposition used in place of a verb) and a request word at least once during my observation. We talk about looking at different parts of speech that Jeffrey is using and we want to see a greater variety of words to make it easier for him to combine words as his communication develops. Diana is receptive to this concept and believes “it’s manageable.” However, she acknowledges it is sometimes difficult to hear on the headset and we increase the volume setting.

When we return to the classroom, the students are at the kidney-shaped table for art and Diana models one-word phrases during this activity. One of the co-teachers is out due to illness, so the other teacher is in charge with a substitute assisting her. Students are still doing well in their activity, but the lead teacher is missed. I suggest via BIE that Diana get her own marker and shapes in order to continue using the mirroring and mapping strategy along with the use of target talk. As I point out that Jeffrey orients himself to her while she is mirroring and mapping, Diana smiles. She is very receptive to feedback and implements the strategies well.

On our second day of practicing target talk, the lead teacher is still out and a substitute is in the room. Students are at the rug for story time and Jeffrey transitions to play with the shape sorter beside them. I coach Diana on the importance of environmental arrangement to promote face-to-face contact and how to position herself to keep Jeffrey in proximity to her. Diana’s personality can be a little reserved at times and this serves her well in providing time for Jeffrey to express himself. While using the shape sorter,
Diana is coached on remembering to model all four of Jeffrey’s targets. After playing with the shape sorter, and then dancing together, Diana and Jeffrey transition with the rest of the class to the table for students to practice drawing circles. Diana pretends to draw circles and Jeffrey is more vocal today. The background noise of the classroom is not so bad, but it is hard to hear Jeffrey’s voice at times.

**Diana’s Perceptions after Implementation of Target Talk**

As we complete the second week of intervention, Diana reflects “he’s remembering words and using those when he wants to communicate with things, but he’s got a couple of new words.” Diana is also hearing him speak more clearly and “his diction is improving.” This week Diana notices that Jeffrey is trying to communicate more clearly with his teachers rather than his classmates. Diana reports that “there’s not a lot of requests yet, other than ‘more’… but… maybe … the one-word nouns and verbs.” Moreover, she believes that most of his expressive turns are comments. When I ask how her interactions have meaning, she is unsure how to answer this question, but believes his communication is getting better. Further, her perspective on ways that her interactions affect his language development is that he is “learning more new words and improving what he knows.” However, Diana does not know if this can be attributed to her or not.

**Implementing Expansions**

Diana has been out sick for a week with allergies, so we have a break before we move on to the expansions strategy. She is excited about this strategy and verifies prior to using the headset that we are still modeling one-word targets. The lead teacher continues to be out and a substitute is in the classroom with the parapro. Due to the space between the wall and ceiling in the classroom, we are able to hear a child who is very upset today
and this affects the comfort level for myself and Diana as we use the headset. Jeffrey and Diana play with kaleidoscope shakers; they are lifted up and down and touch different body parts. Diana has formed a connection with Jeffrey and is able to follow his lead perfectly without being directive. Although coaching is still needed to make sure Diana is not repeating words over and over in one communicative turn (Diana: tap tap tap tap tap) and expansions need to be made more frequently, I am pleased with her progress.

The final day of coaching on expansions has arrived and the same co-teacher is still absent. The classroom is quieter and this enhances the quality of BIE as I can more clearly hear what Diana and Jeffrey are saying today in comparison to yesterday. Diana and Jeffrey toss a soft, plastic apple in the air and against a wall during their play routine today. During this play, Jeffrey uses new words – “bounce,” “drop,” “again,” and combines words – “catch the ball” and “bounce again.” He is also imitating words Diana is modeling. Diana is implementing target talk and expansion strategies well, but mirroring and mapping is not quite at the level it has been on previous days. Diana is expanding some of Jeffrey’s communicative acts, but needs some coaching on expanding Jeffrey’s communicative utterances of “oh” or “wow” to say “wow, ball.”

*Diana’s Perceptions after Implementation of Expansions*

After completing the final week of intervention, Diana reports Jeffrey is communicating more frequently with words and the adults in the classroom are able to determine what he is saying more easily. She acknowledges that as they have been working with Jeffrey more, they have reached the realization that his words have a definitive meaning more often than not. Further, “like today, whenever he would just say ‘wow’ or ‘oh’, and if you expand on it, … he responds to it.” Diana perceives her
interactions affect Jeffrey’s language development in that her focus on being responsive and listening is helping. Moreover, Diana believes her interactions have meaning in that he has grown in his social and language development, and transitions away from his peers more easily. She goes on to say that having fun and playing helps.

**Post Results of Intervention**

Diana and Jeffrey play near the back wall surrounded by three bookcases for their final session in which Diana, independent of me coaching via the headset, applies the responsive interaction strategies she has learned. As they explore toys, they eventually decide to play with the blocks and Jeffrey demonstrates incredible attention span with this play routine. They stack blocks and knock them over for ten minutes with Diana providing support for his language development through the use of the mirroring and mapping strategy numerous times during the observation. After the stacking block routine has ended, Diana demonstrates further growth in her ability to follow Jeffrey’s lead by imitating how he touches the block to different parts of his body, extends and raises his arms, and makes jumping motions with the blocks, all while mapping language onto these actions.

Jeffrey: (stacks block).

Diana: Stack.

Jeffrey: (stacks block).

Diana: (stacks block) Stack.

Jeffrey: (stacks block) Stack.

Diana: (stacks block) stack block.
This helps create very balanced turn-taking between Jeffrey and Diana, promotes use of
target talk at the one-word level by modeling “stack,” and the use of expansions by
saying “stack block” after Jeffrey says “stack.”

Diana’s Post Impressions

As we completed our final session, Diana reports that Jeffrey is now
communicating through the use of both vocalizations that are word approximations and
single-words. She also believes that using the headset was helpful in knowing “how
exactly to apply what I’ve already learned on the job in real time.” Before and after the
implementation of the Bluetooth during coaching sessions, the pre-service teachers were
asked to complete a Likert-scale questionnaire (see Table 4.1). Although she had a
favorable impression of how BIE was prior to its actual implementation, Diana’s final
rating on the use of BIE was 30/30.

Table 4.1
Diana’s Rating of BIE Before and After Use

<table>
<thead>
<tr>
<th>1. Using bug-in-the-ear technology will/enhanced my effectiveness as a teacher.</th>
<th>Before BIE</th>
<th>After BIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Most pre-service teachers would find the approach appropriate for helping pre-service teachers improve their teaching ability.</td>
<td>SA</td>
<td>SA</td>
</tr>
<tr>
<td>3. The bug-in-the-ear feedback should prove/was effective in helping me improve my teaching ability.</td>
<td>SA</td>
<td>SA</td>
</tr>
<tr>
<td>4. I would suggest the use of bug-in-the ear technology feedback to other pre-service teachers.</td>
<td>SA</td>
<td>SA</td>
</tr>
<tr>
<td>5. Most pre-service teachers would find the bug-in-the ear feedback helpful in improving their teaching practices.</td>
<td>SA</td>
<td>SA</td>
</tr>
<tr>
<td>6. Most pre-service teachers would find the bug-in-the ear feedback helpful in promoting language development of young children.</td>
<td>MA</td>
<td>SA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7.</td>
<td>The bug-in-the-ear feedback model is a reasonable way to help pre-service teachers become better teachers.</td>
<td>SA</td>
</tr>
<tr>
<td>8.</td>
<td>I like/liked the procedure planned for use in the bug-in-the-ear model.</td>
<td>SA</td>
</tr>
<tr>
<td>9.</td>
<td>The bug-in-the-ear technology sessions are a good way to help pre-service teachers enhance their teaching ability.</td>
<td>SA</td>
</tr>
<tr>
<td>10.</td>
<td>Overall, I believe engaging in the bug-in-the-ear feedback sessions will be good for me.</td>
<td>SA</td>
</tr>
</tbody>
</table>

Note. BIE = bug-in-the-ear; SD = Strongly Disagree; MA = Moderately Agree; SA = Strongly Agree

In addition to this measure, Diana completed another post-intervention questionnaire that described her perceptions regarding use of bug-in-the-ear technology and the language intervention strategies implemented in this study. Six questions were asked and participants rated if they strongly disagreed, moderately agreed, or strongly disagreed with the statements. In this questionnaire, Diana reported she moderately agreed BIE helped her facilitate language development and that she was prepared to use BIE technology. However, she strongly agreed that BIE was helpful for her communication strategies, encouraging her to use matched turns, target talk, and expansions.

**My Overall Impressions of Diana’s Implementation of RI Strategies**

Diana’s implementation of the RI strategies was the most natural in comparison to her peers. She expressed enthusiasm from the beginning of the study about participating and I believe that she bought into the intervention, in part, due to the opportunity to observe the effect of these strategies from videos I presented in the language course. While these video clips were short, she had an opportunity to witness how to present the strategies and hear testimonies of parents and teachers on how powerful the strategies can be. This may have increased her motivation to try these strategies. However, Diana did
not state this during an interview; as noted earlier, she only referenced she was excited about starting the intervention.

Soon after we began this study, Diana informed me that she practiced strategies with all the children in the classroom throughout her days in her practicum placement when I was not there. Further, Jeffrey’s developmental level was ideal for this study. He responded very well and there was a need for him to receive extra support in his classroom. Therefore, practicing these strategies with a child who needed them and responded well to them may have been reinforcing for her, although it should be noted this was not a question directed to her any point in this study.

Additionally, Jeffrey’s teacher seemed the most excited of all the teachers in the classrooms about having me in the classroom to give a little more of a push to support Diana in her interactions with students. Although Diana had some nice skills in working with students, having one-on-one support provided more direction and affirmation about how to support the development of students. In my opinion, these factors helped Diana have the strongest effect in the implementation of the strategies.

**Suzanne and Daniela**

*My First Impressions of Suzanne, Daniela, and the Classroom*

When you reach the front door of the classroom where Suzanne is participating in her second practicum placement of the Birth to Kindergarten program, a small bookcase is approximately four feet in front of you. On the other side of the bookcase, there is a large area rug for large group activities and a Smart Board on the wall, with a kidney-shaped table and small chairs just beyond the large rug. To the left of this kidney-shaped table, another small bookcase juts out from the wall and creates a space for a large,
rectangular-shaped table with several small chairs surrounding it. On this side of the wall, parallel to the Smart Board and large area rug, three bookcase form three walls to set up a housekeeping area which contains dolls, dress-up clothes, hats, and a small, wooden table with chairs. A door to a small hallway, which contains a storage area and restrooms and adjoins with another classroom, is right next to this table and chairs. On the other side of this door, near the wall connecting to the school hallway is a corner with wooden storage cabinets next to a quiet area where students can calm down and a couple of small tables where students can use their iPads and other materials. An area is also set up here for students to read; additionally, a wooden rack with children’s stories is against the wall near the door to the hallway.

This Head Start classroom has a lead and assistant teacher, and sixteen students 3-4 years old. It is busy and the behavior specialist from the school is in the classroom today to provide support for the teachers and students. Although behavioral challenges occur in this class, some signs of evidence-based practices exist as students are notified how many minutes are left until cleanup to prepare them for transition. Similar to Diana, this is my third interaction with Suzanne; previous interactions took place when I met all of the juniors to discuss the study and she came to my office for the initial interview. Prior to this first observation, Suzanne was asked to wear the headset and play with Daniela as she would if I were not there videotaping her. During my first observation, Suzanne sits on the floor in housekeeping and wears the headset while Daniela plays with dolls. While she is trying to focus her attention on Daniela, other students approach her and tap her on the shoulder for her attention. She is evidently someone the students feel
very comfortable with because another child sits in her lap throughout the duration of this first observational session.

Two more observations were made prior to the intervention due to the noise level of the classroom so that additional details about their interactions could be observed. After checking the first videotaped observation, I was unable to hear anything that Daniela said due to the noise level of the classroom and the low volume of her voice, Therefore, on these subsequent visits, Daniela wears a microphone with an attachment that connects to the camera I am using to record these sessions. Daniela is aware that she is being recorded, but demonstrates a flat affect. When I attached the microphone to the top of her shirt, I tell her “I want to hear your sweet voice so I need you to wear this for me.”

The first time Daniela was hooked up to the microphone system, she wore leggings and there was not a place to put the rest of the audio system, so it lay beside her on the floor. The audio system is a small, rectangular box with a clip and is small enough to clip onto the pocket of a child’s pants. Because she is such a compliant student, this was not a problem but another student asked Suzanne about it. She quickly changed the subject to re-direct him and moved on to direct her attention to other students. During this session, due to the microphone, I can hear Daniela speak while we are in the room. She communicates through gestures (head nods/shakes to indicate yes and no, reaches, etc.), responding with short utterances to questions asked by Suzanne, and begins counting when Suzanne requests this. However, she appears nervous and sometimes looks up at me when Suzanne asks her a question or gives her a command. Sometimes she responds to Suzanne’s attempts to engage her in conversation and other times she does not.
During the three observations, Suzanne is often interrupted by other children seeking attention and/or assistance. For example, another student in the classroom asks Suzanne about the headset and she responds “this is just something I have to wear.” He persists in asking her about it for about 10-15 seconds, but she eventually gets him interested in something else. Periodically, she also makes an effort to try to include other children in the conversation. Although she plays a little, most of the interaction between Suzanne and Daniela consists of describing toys they are using and asking Daniela yes/no and test questions to determine her knowledge about different topics and/or identify the toys they are using.

Suzanne: What’s the cow doing?
Suzanne: Are you going to make it taller?
Daniela: (nods yes).
Suzanne: Yeah?
Suzanne: And taller?
Suzanne: The cow, look Daniela, the cow can sit in there.
Suzanne: Look the cow’s up high.
Suzanne: Oh are you going to put the cow down there?
Suzanne: Oh Daniela there’s some fence. (points to fence)
Suzanne: Do you want to put a fence around the cow? (points to fence)

Suzanne’s experience in working with a speech-language pathologist (SLP) is evident though, as she frequently pairs her comments/questions with gestures to direct Daniela’s attention to objects. Due to frequent questions and comments, and Daniela’s reserved
nature, a large discrepancy exists between the number of communicative turns demonstrated by Suzanne and Daniela.

**Suzanne’s Initial Impressions**

Similar to Daniela, Suzanne has a slightly reserved nature and her answers to the interview questions are usually concise; however, she is always polite and I believe she is honest in sharing her perceptions about this study. Suzanne’s initial impressions of Daniela focused on how she initiates communicating with others, who she communicates with, and her level of communication in comparison to her peers. “She talks sometimes but she’s pretty rare, like, in her communication, but she’ll talk to you if you talk to her. And she talks to her friends, but she doesn’t really talk to any of the teachers.” Suzanne notes that Daniela’s communication is advanced when compared to her classmates; specifically, she believes Daniela has a large vocabulary and will answer questions.

Regarding her perceptions on using the headset, Suzanne states “I’m interested to see how it goes. I really don’t have an opinion one way or the other. I think it’s an interesting concept for sure.” Finally, prior to beginning the implementation of the study, Suzanne was asked to complete the same survey Diana completed at the onset of the study regarding pre-perceptions on using BIE feedback and she rated most of her perceptions as moderately agreeable with a score of 23/30. Areas in which she strongly agreed about using bug-in-the-ear were that it would help her improve her teaching ability, that pre-service teachers would find it helpful in promoting language development and that it is a good way to help pre-service teachers enhance their teaching ability.
Implementing the Intervention

For our first coaching session, Suzanne and I met to review the mirroring and mapping strategy. Although she was unable to attend the presentation I recently made about Enhanced Milieu Teaching in her language course, she had reviewed the presentation, minus seeing videos that were shared in class. Suzanne appears to understand the concepts covered and we practiced mirroring and mapping in a small office space located at the Early Learning Center. We also practiced using the headset in this room before we went into the classroom.

Implementing Mirroring and Mapping

On our first day of coaching via BIE, the students are returning from a long weekend. Both Suzanne and the lead teacher acknowledge this is affecting the behavior of the classroom in reference to a higher activity level and more behavioral challenges when compared to other days. When I call Suzanne on the headset, I seat myself in the hallway near the restroom within range where I could visualize her interactions with Daniela in the housekeeping section of the room. Daniela sits in a closet located within the housekeeping area along with another child to play with dolls and Suzanne sits near her. In the play routine they develop, Daniela is lifting her doll to touch the ceiling of the closet. I begin coaching Suzanne to map language onto these actions by encouraging her to say “dolls jump” or “dolls up.” Although Suzanne continues to ask Daniela questions, she follows Daniela’s lead by putting clothing on her doll. As a mental note, I remind myself to balance these suggestions about what Suzanne should do with providing praise to her for strengths in her interactions and praise her for good use of eye contact. I also notice an increased level of noise in the background while Suzanne and I are using BIE.
As we begin our second day of coaching, emphasizing the use of the mirroring and mapping strategy, I realize that Daniela has become aware that Suzanne and I are having conversations related to interactions with her and notice that Daniela is looking at me during the coaching. Although the noise level has decreased from earlier in the week, I still can’t hear Daniela speaking but see her mouth moving more often. Additionally, while being intentional in her focusing her attention on Daniela, Suzanne manages to balance communication with other students and doesn’t neglect providing attention to others in the room. In this second coaching session, Suzanne is following Daniela’s lead more closely, but is not as close in proximity to her as I would like.

Daniela is becoming a little more assertive and wants the dolls she is playing with today to fight. I coach Suzanne on modeling more appropriate play by adding a blanket to the play to encourage the development of other play schemes with the dolls. During the coaching session, I encourage Suzanne to make sure her utterances are statements rather than questions and to practice mirroring actions, then pausing to see if Daniela would initiate language after a couple of mirroring and mapping episodes have taken place. As a mental note to myself, I wonder if Suzanne would have benefitted from some other adult learning strategies such as video modeling or watching another adult demonstrate these strategies in a classroom with Daniela. Is the BIE enough support for her? On the other hand, Daniela is smiling and seems happy, and initiates a wave to me and says “bye.” Both of the teachers were present, and the lead teacher seems more comfortable with my presence.
Suzanne’s Perceptions after Implementation of Mirroring and Mapping

With the conclusion of the first week of intervention, Suzanne reports that Daniela is someone who communicates when others seek to communicate with her.

“When you are interacting with her, she’ll talk with you.” She also provides some specifics in how Daniela communicates and believes she communicates through the use of phrases or small sentences rather than asking questions. Suzanne is getting a sense that Daniela is growing more comfortable with her:

And she wanted me, when I came over to sit next to her, she asked to get the … Tigger doll that I played with the other day. Cause she remembered that, so she was, like, ‘can you get that one?’, and I was, like, ‘OK’. So that was good. I think she likes the interaction.

Moreover, Suzanne believes that her interactions have meaning because Daniela appears to have noticed the extra attention she is receiving from Suzanne and enjoys it. Suzanne went on to say that her interactions may affect Daniela’s language development because she appears to be talking more and increasing her language.

Implementing Target Talk

Due to the length of the presentation on target talk, Suzanne and I miss a day of coaching before we are able to implement the target talk strategies in the classroom. While we are reviewing the presentation on target talk, Suzanne states that Daniela speaks in longer phrases and sentences when I am not there. However, we discuss that because Daniela has such a low rate of language, we do not want to place significant demands on her and Suzanne will model words at a two-word target level. The targets that Suzanne will model are: (a) agent + action (noun or pronoun paired with an action word), (b) action + agent (action word paired with a noun), (c) modifier + noun (a descriptive word such as color, size, or number paired with a noun), and (d) a 2-word
request (any request word such as want, help, need, etc. paired with another word). During this coaching, I wonder if Suzanne is invested or what she thinks about this project. She is quiet, but I have a sense that she is not quite sure about this.

When we begin coaching, I stay in the classroom but remain across the room from where Suzanne and Daniela are playing on the large area rug with blocks. Being able to hear Suzanne and Daniela is more challenging today due to the noise, but turn-taking exchanges between the two of them are showing improvement. Although Suzanne is continuing to ask some questions, she is able to model each of the four 2-word targets we are using with Daniela. In particular, the action-agent target of “stack blocks” is used several times during this session. Suzanne is having some difficulty with the sequencing in mirroring and mapping and following the lead does not appear to occur as frequently as it did in the previous session.

As we moved into our second day of coaching with a focus on target talk, the lead teacher is absent and a substitute is present. Even with this change to our usual routine, teachers loudly and frequently count down how much time remains before the class will transition to cleanup. Daniela is in the housekeeping center when we begin our coaching and greets me with a smile and wave as I arrive and leave the classroom. Daniela is more conversational, which diminishes the need for modeling target talk; however, Suzanne is able to model three of the four types of targets during this session and turns appear more balanced with more wait time provided. Suzanne continues to interact with other students while focusing on Daniela. I note to myself that the noise level contributes to the quality of BIE coaching one can provide.
Suzanne’s Perceptions after Implementation of Target Talk

With the completion of a second week of intervention, Suzanne reports that Daniela is asking her to do things and tells her what she is playing with. She also notes that Daniela has an assertive communication style with her friends. Suzanne reflects that how Daniela communicates is dependent upon whom her communication partner is – teacher or peer. Moreover, Suzanne perceives that her interactions with Daniela are meaningful “because I think that she likes when I play with her, so I think that is meaningful to her because she knows that, like, she gets time to play with me and I’ll do what she’s doing.” However, Suzanne wonders if her interactions affect Daniela’s language development and attributes increases in communication development to the growing comfort level that is developing between the two of them.

Implementing Expansions

After completing our sessions focusing on target talk, Suzanne and I move on to learning about expansions and I am getting a sense that she feels more receptive to this intervention today. All of the teachers are in the classroom and, despite some children who are crying, the class is calmer today; teachers are not counting down how many minutes were left of center-time, and the Smart Board is not depicting a countdown of how much time remains before transitions. Daniela is situated on the large area rug today and she is playing with soft blocks. I make a note to be more intentional in praising and using positive language with Suzanne today and notice she is implementing some responsive interaction strategies better today. Additionally, I wait a couple of minutes in between how often I provide coaching so that Suzanne would not feel so overwhelmed with feedback. Suzanne is not asking as many questions and frequently models “stack the
blocks” for most of the target talk she used. However, I do note the need to continue with mirroring and mapping and to remember to expand gestures that Daniela uses in her communication. Due to the difficulty in hearing Daniela in this classroom, even though it was quieter than usual, I could not provide coaching in the moment of how Suzanne could expand Daniela’s communicative acts. I am seeing improvement in the use of responsive interaction strategies and am pleased.

For the final session of coaching on expansions, in our “setting the stage” discussion, Suzanne and I discuss the need to expand gestures and that she is doing well prior to the BIE coaching session. The classroom continues to be a little calmer today and the teachers do not provide warnings about how many minutes are left until transition quite as often as they have during previous sessions. Daniela is a little more excited though and runs around the room for a couple of minutes before her lead teacher asks her to play with Suzanne. During the play today, Suzanne and Daniela begin playing with Barbies before switching to Lego®. After a few minutes, Suzanne hits her groove and models a variety of 2-word targets: “stack the block,” “block on,” “red block,” etc. She also is showing improvements in following Daniela’s lead and mirroring and mapping.

Suzanne was a trooper today as she is tired at the end of the semester with allergies, including a scratchy eye.

_Suzanne’s Perceptions after Implementation of Expansions_

At the conclusion of the final week of intervention, Suzanne states that Daniela “communicates through play and with her friends.” Suzanne reports that Daniela will initiate some, but more often responds to the communicative acts of others. Specifically, in terms of how she communicates, Daniela is described as using one-word phrases.
periodically, and typically uses phrases or questions to communicate. In describing what she is noticing or anticipating about Daniela’s communicative acts, Suzanne reports “I think she’s becoming more imitative and she talks to me more when I play with her. I don’t really, like, have to get her to talk. She’ll just talk naturally.” A bond appears to have developed between Suzanne and Daniela. Suzanne’s perception about how her interactions with Daniela have meaning because Daniela appears to enjoy that interaction and doesn’t interact with the other adults in the classroom very often. An example Suzanne provided illustrates this connection, “she’ll, like, say ‘hey’ to me and stuff when I get to the school” and believes this has changed since we began this study. Further, Suzanne reports her interactions may affect Daniela’s language development in that Daniela is describing things more than she previously was.

Post Results of Intervention

Due to illness, a field trip, and finals, an observation of Suzanne and Daniela without being coached via the headset did not take place. This was the only dyad not to have a videotaped observation of the pre-service teacher implementing strategies without the headset after receiving coaching. However, during a post interview, Suzanne went on to say that she became better at mirroring Daniela’s actions towards the end because it was not a strategy that felt natural for her at the beginning.

Suzanne’s Post Impressions

At the conclusion of the intervention phase, Suzanne describes Daniela’s way of communicating as one of communicating through play, she communicates with her friends, and that she communicates her needs. Daniela’s expressive communication consists of using phrases and she still does not initiate communication very often.
Suzanne also shares that while she believes the concept of using a Bluetooth for coaching is interesting, she is unsure if it is a practical tool due to the busy nature of classroom environments. Specifically, “it is very hard to listen to the feedback in the ear while also trying to listen to the child and everything that’s going on.” She also suggests that using a Bluetooth may be of greater benefit in working with multiple students versus just one.

When asked to complete the post-Likert scale questionnaire (see Table 4.2), Suzanne rated the use of BIE with an overall score of 18/30. This score indicated she moderately agrees that BIE feedback can be helpful and useful in promoting positive teaching practices and supporting language development. However, it should be noted that her response to four statements indicated a decreased perception in the use of BIE from the onset of the study. Specifically, the three areas that she had previously said she strongly agreed with the statements (help her improve her teaching ability, that pre-service teachers would find it helpful in promoting language development and that it is a good way to help pre-service teachers enhance their teaching ability) were now classified as moderately agreed. Further, two areas that were previously rated as moderately agreed (suggesting the use of BIE to other pre-service teachers and that using BIE would help them with their teaching practices) were now rated as strongly disagreed.

Table 4.2.
Suzanne’s Rating of BIE Before and After Use

<table>
<thead>
<tr>
<th>Statement</th>
<th>Before BIE</th>
<th>After BIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Using bug-in-the-ear technology will/enhanced my effectiveness as a teacher.</td>
<td>MA</td>
<td>MA</td>
</tr>
<tr>
<td>2. Most pre-service teachers would find the approach appropriate for helping pre-service teachers improve their teaching ability.</td>
<td>MA</td>
<td>MA</td>
</tr>
<tr>
<td>3. The bug-in-the-ear feedback should prove/was effective in helping me improve my teaching ability.</td>
<td>SA</td>
<td>MA</td>
</tr>
</tbody>
</table>
4. I would suggest the use of bug-in-the-ear technology feedback to other pre-service teachers.  

MA | SD

5. Most pre-service teachers would find the bug-in-the-ear feedback helpful in improving their teaching practices.

MA | SD

6. Most pre-service teachers would find the bug-in-the-ear feedback helpful in promoting language development of young children.

SA | MA

7. The bug-in-the-ear feedback model is a reasonable way to help pre-service teachers become better teachers.

MA | MA

8. I like/liked the procedure planned for use in the bug-in-the-ear model.

MA | MA

9. The bug-in-the-ear technology sessions are a good way to help pre-service teachers enhance their teaching ability.

SA | MA

10. Overall, I believe engaging in the bug-in-the-ear feedback sessions will be good for me.

MA | MA

Note. BIE = bug-in-the-ear; SD = Strongly Disagree; MA = Moderately Agree; SA = Strongly Agree

In addition, Suzanne completed another post-intervention questionnaire that described her perceptions regarding use of bug-in-the-ear technology and the language intervention strategies implemented in this study. Six questions were asked and participants rated if they strongly disagreed, moderately agreed, or strongly disagreed with the statements. In this questionnaire, Suzanne reported she strongly disagreed BIE helped her facilitate language development. She also noted moderate agreement that BIE was helpful for her communication strategies, encouraged her to use target talk and expansions, and that she was prepared to use BIE. However, she strongly agreed that it was helpful in encouraging her to use matched turns.

My Overall Impressions of Suzanne’s Implementation of RI Strategies

Unfortunately, due to extenuating circumstances, post-data were not collected to examine Suzanne’s use of RI strategies without coaching which was disappointing
because I did notice her use of the strategies, as well as some changes in the way that she
and Daniela interacted with one another. Suzanne seemed willing to try the new
strategies, but I believe the responsive way of interacting with students may have
contrasted with previous experiences she has had on how to facilitate language
development with young children. As she stated, mirroring and mapping did not feel
natural to her. Anecdotally, she appeared to become more comfortable with the use of
target talk than the other strategies reviewed over the course of the intervention.

Lily and Kendrick

My First Impressions of Lily, Kendrick, and the Classroom

When you reach the door of the classroom of Lily’s practicum, immediately to the
left is the first restroom in the classroom. Along the left the wall, a sink area with
cabinets line the center of the wall before reaching a second bathroom. Located near
these walls are an art easel and a couple of large, rectangular tables with chairs scattered
around them. There is a large sensory table along the back wall that leads into the
housekeeping center in the back right corner of the room. The housekeeping center
contains dress-up clothes, a crib, a wooden refrigerator and stove, table and chairs, and
other materials such as dolls, pots and pans, cooking utensils, plastic foods, and plastic
eating utensils.

Three bookcases help separate the large area rug used for large group. This large
group area also contains a couple of bean bag chairs and a Smart Board. One bookcase is
located beside the housekeeping center, one separates the large area from the rectangular
tables and sink, and the third serves as a barrier between the front right corner area of the
room. These bookcases contain a variety of toys such as transportation toys, large
cardboard blocks, and puzzles, etc. In the front right corner of the room, the lead teacher’s desk and a couple of small tables with chairs are situated for small group work, including one with computers. Finally, large, wooden storage cabinets are in the corner of the room and another bookcase juts out from the wall near the front door with cubby holes for student belongings and paperwork.

This Head Start classroom has a lead and assistant teacher, and 16 students age 3-4 years old. While this class does not have students demonstrating the behavioral challenges observed in Suzanne’s classroom, it is busy and there is a constant level of noise from so many voices in one space. Unlike Diana and Suzanne, I had some interactions with Lily prior to this study while serving as her online instructor in an introductory special education course a year before this study began. However, this was my third time in meeting her face-to-face; previous interactions occurred during my initial meeting with the juniors to discuss the study and for the initial interview. During my first observation, Lily is told to interact with Kendrick as she normally would and Kendrick wears the microphone with the audio system attached to his jeans pocket. His initial facial expression indicates he doesn’t really know what to think about this. He primarily uses head nods and shoulder shrugs to communicate during the first couple of minutes. However, by the second minute, he has begun to speak using some multi-word phrases and, in the third minute of the observation, when the microphone slipped out of the clip attached to his shirt, he seeks Lily’s assistance in re-connecting it.

When we were unable to obtain paperwork from a child in this classroom who exhibited some signs of delays in her communication skills, Kendrick was the child chosen by his teachers and I wonder how this intervention will work with him due to his
high rate of communicate acts and large vocabulary. Kendrick is entertaining and I was told he likes to rap. He has an assertive personality and is very expressive in his communication style. In fact, later on in the first observation, he pulls the microphone up to his mouth to scream into it so he could discover how that would sound.

On this first day of observation, Lily is excited to get started. She has a bubbly personality and Kendrick is playing in housekeeping. According to Lily, this is typically his first choice and students select the center they want to play in each day. A couple of other students are playing in the housekeeping center and Lily interacts/assists them as needed, but primarily focuses on her interactions with Kendrick. She is a great conversationalist and frequently asks Kendrick questions about what he is doing; however, many of her questions run together and she uses test and yes/no questions to determine Kendrick’s ability to label and identify objects. During these conversations I notice that Lily doesn’t seem to join in on the play. She might hold an object or show an object to Kendrick, but she is not a partner in engaging in the activities. Lily also asks Kendrick questions to encourage him to be more mindful for safety. For example, on this day, Kendrick holds a doll upside down and Lily asks him “is that a good way to hold a baby?”

On the second day, while they are seated at the rectangular table by themselves, they play with magazines, tape, and scissors. There are also signs that Lily is not completely comfortable in this classroom and is still developing her sense of classroom management skills in this placement when she interacts with Kendrick:

Lily: Kendrick, I don’t think we need to put those in there.

Lily: Do you see what’s in there?
Lily: They are crayons.

Lily: This is the crayon bucket so make sure you put all of these back in this bucket so Mrs. Teacher doesn’t get mad.

Lily: Okay?

Just as Kendrick is expressive in his facial expressions and body language, Lily demonstrates these same characteristics and frequently laughs at the things Kendrick says and does. Although I continue to wonder how well the use of the responsive interaction strategies are going to work with a child who communicates as well and frequently as Kendrick does, I know they will be an entertaining pair to collaborate with each week!

**Lily’s Initial Impressions**

According to Lily, Kendrick’s communication levels vary when he is with someone one-on-one versus in a large setting. She reports that he communicates using gestures and pointing with his head when in a group environment and only communicates verbally if he is in a one-on-one situation. Lily also notes that she does not have any concerns about his cognition. In terms of how she feels about using a Bluetooth, Lily believes she gets the premise of how it works. However, she admits:

I don’t know how I’ll feel about it personally just because, like, I feel like I’ll probably be in the middle of something and you might say something and I’ll be, like, ‘ah, stop’ and the kids will be, like, ‘what are you doing?’, but I’m interested to see.

Similar to the other pre-service teachers, Lily has had limited exposure to a Bluetooth or headset and says that she has only seen this used on television shows.
Implementing the Intervention

Prior to our first session of practicing with the Bluetooth, Lily reviewed the Powerpoint of the recent presentation I made about EMT in the language course, minus the video clips, as she was unable to attend class due to illness. On our first day of coaching, Lily reports that Kendrick was admitted to the emergency room due to an allergic reaction, but this doesn’t seem to be affecting him. We are under a tornado watch, but Lily appears to be happy, energetic, and excited.

Implementing Mirroring and Mapping

As soon as I call Lily on the headset, I position myself near the sink, but the reception does not work and I have to move across the room. Today’s play routine with Kendrick consists of stacking Lego® pieces, looking at a book and wearing a hat and cape. Lily continues to use a lot of questions when interacting with Kendrick and is not using the mirroring and mapping strategy as often as I would like. One positive is that she does not mirror Kendrick’s behavior when he throws an object across the room. When I provide coaching via BIE on using the mirroring and mapping strategy, Lily looks at me across the room when I would speak and I am unsure how she feels about BIE. During this session, the class is interrupted by the principal of the school on the intercom who discusses the weather and reminds students that they are safe.

On our second day of coaching, Kendrick and Lily play with a toy set that has sticks coming out of a wooden board and beads that are dropped over the sticks. Kendrick likes to have possession of these materials and removes beads that Lily puts on the sticks. He also takes the beads out of her hand. Although our coaching session is meant to be focusing on mirroring and mapping, I also coach Lily on making sure that she is
maintaining greater control of the materials. Even though she follows Kendrick’s lead, he does not have to be in charge of everything. After 2-3 minutes of this play, they move on to play with puzzles. A rack containing several puzzles has been placed on top of one of the bookcases and Kendrick takes four of the puzzles out for play. I coach Lily on being a gatekeeper and she keeps possession of the puzzles to promote more interaction between the two of them. As they are playing with the puzzle pieces, I coach Lily that as the pieces are inserted or removed from the puzzle, she should say “piece in” or “piece out” as appropriate. Lily starts to get a better understanding of how to apply this strategy and I notice improvement from our session earlier in the week.

**Lily’s Perceptions after Implementation of Mirroring and Mapping**

After the first week of coaching, Lily is more descriptive in providing details about different aspects of Kendrick’s communication style. In comparison to Kendrick’s peers, she believes his verbal skills are very good, and he expresses himself through his eye contact, voice inflections, and facial expressions. Lily has also noticed that Kendrick seems more receptive to peer interactions and mentions she was surprised before my arrival that day, Kendrick let her play with him. Lily hopes and predicts his interactions with others will improve. When asked about how her interactions with Kendrick have meaning, Lily struggles to find an answer and states he is more open with people and she appreciates how easy it is to talk with him. Moreover, she perceives that her interactions affect his language development by keeping language on a developmentally appropriate level, which is a contrast in the way her lead teacher communicates with the students.
Implementing Target Talk

In the second week of implementing our intervention, Lily and I review the concept of target talk prior to our BIE session. We discuss whether or not to model 3- or 4-word targets and the pros/cons of those decisions. Ultimately, due to the size of Kendrick’s vocabulary, we agree to model 4-word phrases and practice examples that we could use. The targets Lily will model include: (a) use of a modifier (descriptive word that may be a color, size, or number) in a 3-5 word phrase, (b) use of a preposition in a 3-5 word phrase, and (c) a 4-word request. As we are in the “setting the stage” component and later, while I am coaching her, I sense that Lily is interested in this study and learning more about the intervention. During their play, Lily primarily models phrases using prepositions, but requires considerable support to stay at this level. This is not surprising. Learning to model all of your phrases at a minimum of four words and making sure that you are using action rather than helping verbs is hard, especially given the increase in background noise we hear while we are using the headset today.

On the second day of coaching target talk, Kendrick seems a little off and I learn that he saw the Easter Bunny before my arrival, which made him a little uneasy. During our coaching session, Kendrick is playing with wooden houses, ramps, and cars on the large area rug near the Smart Board with two other little boys. Although she does not use mirroring and mapping strategies very often today, Lily models a variety of 4-word targets during her interactions with Kendrick. When she wants to take communication turns just using words such as “wow” or “uhoh,” I coach her to lengthen these turns by adding more words in order to meet our goal of modeling fifty percent of our phrases at a minimum of four word utterances or slightly above this target level. I also coach her on
making sure her interactions are conversational rather than teaching new concepts to build Kendrick’s base of knowledge.

Modeling helping verbs versus action verbs continues to be challenging for Lily and sound is a problem today. Both Kendrick and Lily look at me a couple of times during this session; I am a little surprised Kendrick doesn’t ask why I am there or what I am doing, but I sense he knows I am there to work with him and Lily. While I am in the classroom today, Lily sometimes nods her head to indicate she understands what I am saying and she tells me “hold on” when a behavioral challenge occurs. When she uses specific praise in working with the students I praise her on this. I am pleased she remains a good sport about trying these strategies despite the challenges of implementing this particular intervention strategy.

_Lily’s Perceptions after Implementation of Target Talk_

Lily notes that how Kendrick communicates may be affected by his mood and that he appeared to have been a little rattled by the appearance of the Easter Bunny at school today. She reports that Kendrick spoke in a very loud voice and did not use eye contact, even when she encouraged him to look at her. Similar to last week, Lily predicts Kendrick will become more receptive to peer interactions and says that Kendrick will typically only interact with a couple of his peers. Lily went on to illustrate this is an area he struggles with by describing how he became frustrated while playing with two other boys he normally doesn’t interact with earlier in the day. However, she acknowledges there were some moments in which he was cooperative in playing with them. Also, similar to last week, Lily struggles to answer how her interactions with Kendrick have meaning. “I have trouble answering this question, mainly because I don’t know what it,
what you mean by that. Is that an answer? I just don’t know.” Finally, she believes her interactions affect Kendrick’s language development in that if a child doesn’t understand what she’s communicating they may not want to interact with her.

**Implementing Expansions**

As we move onto implementing the final strategy, expansions, the class is in disarray while the lead teacher is out sick. Lily seems excited about using this strategy. However, when we arrive to the classroom, Kendrick and another child are fighting. Lily tells me that fighting occurs more when the lead teacher is absent. Due to the lead teacher’s absence, center-time is shortened considerably so the class could go outside. I coach Lily as she assists Kendrick in cleaning up the classroom alongside his peers and a focus continues on using the mirroring and mapping and target talk strategies. Kendrick was a little quieter today and it is hard to hear him today due to the increased noise level. I continue to feel good about Lily’s interest and enthusiasm with this study.

Our final day of coaching has arrived and Kendrick is enjoying water play in the classroom and halfway through the session is joined by one of his classmates. Mirroring and mapping is still not being used very often during interactions, but Lily is making strides in modeling language at Kendrick’s target level. The noise level in the classroom is kind of high and I try to give her some space in thinking through the application of these strategies. Providing coaching in a classroom with a considerable amount of noise is harder, especially when you need to be able to hear the child’s voice so you can coach the pre-service teacher on how to respond with an expansion.
**Lily’s Perceptions after Implementation of Expansions**

After completing our final week of coaching, Lily acknowledges that her answer to how Kendrick communicates will be the same as the two previous weeks. She reports he communicates verbally and believes his developmental skills are age-appropriate. Further, Lily states that Kendrick uses a lot of inflection in his voice, along with eye contact, when he is communicating with others. Lily notices that Kendrick’s communicative acts will remain consistent with how they have been because every time she expanded his utterances, there wasn’t a need to expand because of the way he had already used descriptive language. This week, Lily is pleased to have an answer about how her interactions with Kendrick have meaning:

I think interacting with someone who does not have perfect communication skills, but somebody who has higher communication skills than he does… just kind of helps him see… and … hear how he’s gonna be taking in the future… or what he needs to work towards.

Finally, Lily believes her interactions affect his language development in that she is able to be a model for him to use more complete sentences in his communication.

**Post Results of Intervention**

During our last day in which Lily and Kendrick were observed, Lily and Kendrick sit at a rectangular table with another little boy in Kendrick’s class and plays with beans in plastic containers while Lily applies the responsive interaction strategies she has learned independent of me coaching via the headset. Due to the high rate of communication Kendrick demonstrates, the implementation of the responsive interaction strategies has been more challenging for Lily, but some signs of embedding the strategies
into the routines is evident and she has decreased the number of test and yes/no questions she asks Kendrick.

Lily: Let’s help John Doe count (points to box).
Kendrick: No these are X.
Lily: OK.
Kendrick: (pours beans in box).
Lily: (pours beans in box) We’re pouring the beans back in the bowl?
Kendrick: I lost a bean.
Lily: You lost the bean?
Lily: It’s OK.
Lily: We’ll find it later.
Kendrick: I got it.

However, a considerable discrepancy in turn-taking exists between the dyad as Lily still takes several turns in a row without pausing for Kendrick to communicate. During this observation, she successfully embeds several correct mirroring and mapping episodes into the play and models each of the three different targets used when working with children at a 4-word target level. Furthermore, despite the challenges in expanding a child’s language when they typically have a longer mean length of utterance, Lily expands some of Kendrick’s communicate acts.

**Lily’s Post Impressions**

Upon completing the post observation, Lily reflected on how Kendrick communicates. Consistent with previous weeks, Lily reported that he communicates verbally, uses eye contact, voice inflection, and a lot of gestures. She also believes that
his use of language is appropriate for his age. In fact, his vocabulary surprises her at
times. An illustration of this was provided by Lily, “he was, like, ‘they’ve got a, um, red
Chevrolet over there’ and I was, like, ‘well, he said ‘Dodge’ the other week’, so I was …
I wouldn’t even call it a Chevrolet. It’s so funny!” Despite previously stating that she did
not care for using a headset, Lily acknowledged “I feel it can be helpful, if, … done
correctly and you have a good coach. And you’re a good coach.”

When asked to complete the post-Likert scale questionnaire (see Table 4.3), Lily
rated the use of BIE with an overall score of 20/30. The majority (n = 6) of the responses
were rated as moderately agree, while the remaining four responses were evenly split
between strongly agree and strongly disagree. Specifically, two of four areas that she had
previously said she strongly agreed with the statements, she continued to strongly agree
with (help pre-service teachers become better teachers and that it is a good way to help
pre-service teachers enhance their teaching ability). In contrast, two of the four
previously rated as strongly agree, were now classified as moderately agreed (suggest use
of BIE to other pre-service teachers and like the procedure planned for BIE).
Furthermore, two areas that were previously rated as moderately agreed (pre-service
teachers would find the BIE approach appropriate for helping improve their teaching
ability and pre-service teachers would find that using BIE would help them improve their
teaching practices) were now rated as strongly disagreed.

Table 4.3

<table>
<thead>
<tr>
<th>Lily’s Rating of BIE Before and After Use</th>
<th>Before BIE</th>
<th>After BIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Using bug-in-the-ear technology will/enhanced my effectiveness as a teacher.</td>
<td>MA</td>
<td>MA</td>
</tr>
<tr>
<td>2. Most pre-service teachers would find the approach appropriate for helping pre-service teachers improve their teaching ability.</td>
<td>MA</td>
<td>SD</td>
</tr>
</tbody>
</table>
3. The bug-in-the-ear feedback should prove/was effective in helping me improve my teaching ability.  
4. I would suggest the use of bug-in-the-ear technology feedback to other pre-service teachers.  
5. Most pre-service teachers would find the bug-in-the-ear feedback helpful in improving their teaching practices.  
6. Most pre-service teachers would find the bug-in-the-ear feedback helpful in promoting language development of young children.  
7. The bug-in-the-ear feedback model is a reasonable way to help pre-service teachers become better teachers.  
8. I like/liked the procedure planned for use in the bug-in-the-ear model.  
9. The bug-in-the-ear technology sessions are a good way to help pre-service teachers enhance their teaching ability.  
10. Overall, I believe engaging in the bug-in-the-ear feedback sessions will be good for me.

Note. BIE = bug-in-the-ear; SD = Strongly Disagree; MA = Moderately Agree; SA = Strongly Agree

In addition, Lily completed another post-intervention questionnaire that described her perceptions regarding use of bug-in-the-ear technology and the language intervention strategies implemented in this study. Six questions were asked and participants rated if they strongly disagreed, moderately agreed, or strongly disagreed with the statements. In this questionnaire, Lily reported she strongly disagreed about feeling prepared to use BIE technology, she moderately agreed BIE provided helpful feedback for communication, facilitating language development, and encouraging her use of matched turns. However, she strongly agreed that it was helpful in encouraging her to use target talk and expansions.
My Overall Impressions of Lily’s Implementation of RI Strategies

In many ways, Lily had the most challenging experiences in learning to implement the responsive interaction strategies. A large number of students (n = 16) were in her classroom, along with two extra teachers, so the ability to hear BIE feedback impacted her ability to follow through on my suggestions. In addition, nearly all of her coaching sessions involved other students participating in the centers which added more challenges in attending to them as needed, along with managing how Kendrick interacted with his peers. Moreover, Kendrick’s higher level of functioning and assertive personality made the implementation of these strategies more challenging. He has a tendency to want to control materials and be in charge of the play, and coaching Lily to follow his lead while also coaching her on developing a greater sense of comfort in implementing behavior management skills made for some interesting coaching sessions.

Mirroring and mapping is a strategy particularly useful when children have low rates of communication, which wasn’t the case for Kendrick. However, it can encourage the child’s communication partner to become more engaged in the play routine. Although the implementation of this strategy developed to an extent over time, I am not sure Lily quite understood how often this strategy should be implemented. Moreover, Kendrick is a child who is on the go and keeping up with him, along with his peers, was challenging. In terms of using target talk, Lily modeled all of the targets in her final observation, but did not reach the goal of 50 percent of language modeled being at the target level. As stated earlier, implementing fifty percent of one’s communicative turns using at least four words is very challenging. One sign of growth in this area was that Lily significantly reduced the number of questions she asked Kendrick. Overall, despite these challenges, I
was pleased with Lily’s positive attitude and interest in the study, especially since she expressed that she did not like BIE during the first week of implementing this study.

**Summary**

In this chapter, results from data collected for each pre-service teacher and target child were presented. Overall findings suggest that despite feeling overwhelmed at times by background noise and stimulating classroom environments, pre-service teachers did at least moderately agree that the use of BIE technology may be helpful in learning to implement responsive intervention language intervention strategies in a classroom with young children. Moreover, at least two of the pre-service teachers, Suzanne and Lily, indicated that learning about the strategies may have helped them re-consider how to interact with young children. In addition, some small changes were noted in how Jeffrey and Daniela responded to their pre-service teacher’s use of RI strategies. Anecdotally, Jeffrey was noted to use vocabulary words that Diana had not heard and Daniela began initiating communicative acts with both Suzanne and myself. Chapter 5 includes the discussion of the findings, responses to the research questions, and a discussion about limitations and implications for future research.
CHAPTER 5

RESULTS

According to Symbolic Interactionism (SI), meaning is perceived as something that develops during interactions between individuals and their contexts (Blumer, 1969). Due to the gap that exists between research and the implementation of best practices in the field of early childhood special education (ECSE; Odom, 2009), a careful examination of how pre-service teachers in ECSE perceive interactions that occur during learning experiences in their practicum placements may be useful in providing them the support they need as they develop their pedagogical skills. The implementation of coaching via immediate feedback is one way university supervisors can support pre-service teachers in their practicum settings. In practicum settings for young children, the ability to promote and facilitate the language development and communication skills of students is an integral part of effective teaching strategies.

The goal of this study was to explore the use of bug-in-the-ear (BIE) technology in supporting pre-service teachers’ use of responsive interaction (RI) language strategies while interacting with students in their practicum settings. The four research questions examined in this study were: (1) What benefits do the pre-service teachers perceive from using the bug-in-the-ear technology when receiving coaching during practicum? (2) What challenges do the pre-service teachers perceive from using the bug-in-the-technology in receiving coaching during practicum? (3) How does coaching affect pre-service teacher use of responsive interaction (RI) strategies? and (4) What changes in the target child’s
communicative acts were observed through the course of this study? The use of symbolic interactionism was used as a lens to understand the perspectives of the pre-service teachers who participated in this study.

**Understanding the Perspectives of Participants**

In this section, each of the four research questions will be answered, along with themes constructed through coding. Questions in this section were coded from responses provided by all three of the pre-service teachers and from transcripts obtained during the pre- and post-intervention videotaped observations. Four codes were used in describing how BIE was beneficial and four codes were used in describing how BIE was challenging (See Table 5.1).

**Table 5.1 Qualitative Codes**

<table>
<thead>
<tr>
<th>BIE Is Beneficial</th>
<th>BIE Is Challenging</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Promotes awareness of needed changes</td>
<td>• Background noise/technical issues</td>
</tr>
<tr>
<td>• Amount and tone of feedback is key</td>
<td>• Concerns about other students needing attention</td>
</tr>
<tr>
<td>• Likes knowing what to do immediately</td>
<td>• Feeling overwhelmed</td>
</tr>
<tr>
<td>• Serves as reminder for interactions throughout the day</td>
<td>• Concerns about student reactions to wearing the Bluetooth Headset</td>
</tr>
</tbody>
</table>

As a reminder, prior to implementing BIE, none of the pre-service teachers had received BIE feedback.

**Research Question 1**

The first question posed explored the benefits that pre-service teachers perceive from using the bug-in-the-ear technology when receiving coaching during practicum. Four codes were addressed to answer this question: (a) promotes awareness of needed
changes, (b) amount and tone of feedback is key, (c) likes knowing what to do immediately, and (d) serves as a reminder for interactions throughout the day.

Promotes Awareness of Needed Changes. Two of the pre-service teachers, Diana and Lily, put forth that the use of BIE made them aware of how to use language intervention strategies and how to interact with their students. According to Diana, “it helps a lot with … knowing right then what I… should do.” Lily provided greater details on two separate occasions of how BIE affected her interaction with students. Early in the intervention she noted, despite some reservations about the use of BIE:

I feel like I’m able to overcome it and do what you tell me to do (laughs). I just kind of tell my own brain to be like, “Stop! Just listen to what Laura is telling you right now.” (laughs) I keep forgetting to, like, label, my actions and, so, I will notice that I’m doing that, and mentally, I’m like, “label your actions.” And, then, I don’t know, it’s like, I’m like, “Laura didn’t tell me to.” (laughs)

At the end of the study, she provided thoughtful reflection on using BIE and how it has shaped her interactions with students:

It helped a lot. Like, a lot. I, I was thinking about it and the more I thought about it, you know, I didn’t, you know, all I did was ask questions before we started doing this (laughs). Well, not like all I did. But, like, the majority of my interaction was just asking questions to kids and I, you can’t do that, like, all the time. Like, it’s good just if you’re, like, asking them to see if they’re learning. Like, they’re learning opposites right now and so, maybe when I’m asking questions, that’s what I want to focus on, but… Mmm, just the different strategies you’ve taught us. Like, I was aware of them, but I never actually, like, used them before.

Amount and Tone of Feedback Is Key. Each of the three pre-service teachers indicated the amount and tone of feedback can make the use of BIE helpful. One pre-service teacher, Suzanne, noted she felt as though she received the right amount of feedback. Another pre-service teacher, Diana, specified she appreciated the positive feedback she received in this experience:
I did like the, the positive feedback on knowing … whenever you tell me that “that was good” … It’s nice to know that what I’m currently doing is … the right thing or, or a good way to do what I’m doing. So yeah, that, the positive feedback helped probably just as much as the suggestions.

Lily also put forth her views on how the amount and tone of BIE can be key:

I feel like it can be helpful, if, you know, done correctly, and you have a good coach, and you’re a good coach. I feel like someone who’s willing to work with you if you are getting frustrated, which you were, so that’s great. Um, someone who doesn’t give, like, a lot of feedback, but is able to tell, like, for each person they’re coaching with, what the right amount is so you can, like, analyze their pre-service teacher or whatever. And someone who’s just, like, really encouraging and does, like, tell you what you need to work on bit also, doesn’t necessarily focus on that.

**Likes Knowing What to Do Immediately.** Two of the pre-service teachers, Suzanne and Diana, reported that they found hearing feedback in the moment to be a helpful and positive experience. Suzanne noted “it is good ‘cause I can, like, change what I am doing right then, so that’s good.” Similarly, Diana described why she found immediate feedback to be beneficial in working with young children:

I think it, it is more helpful because you’re able to make adjustments right then instead of taking what has been told to you and applying it later, and I think it’s also more helpful for the child. Because if you’ve been observed working with the child and you did something that could have been done better and then you hear about it later and you’re, like, “oh, I really could’ve” (laughs). I think with the BIE just, it helps the child personally because then they’ll get that… higher quality of interaction.

Furthermore, she reflected:

I feel like it is helping in the moment. What I need to be doing… it’s nice knowing that what I am doing is right and good ‘cause, otherwise if I, if I didn’t, if I was just kind of doing it I wouldn’t really know if, like, that’s the correct way to do it until afterwards and then I’d have to remember back. It’s nice knowing in the moment what I am doing is right.

**Serves As a Reminder for Interactions throughout the Day.** Two of the pre-service teachers, Lily and Diana, discussed how they take BIE feedback they have received in
coaching sessions and apply it other times of the day at different points in the study. At the onset of the intervention, Lily reported:

Wednesday, after you left, I kept doing it, and um, I don’t, the main times that I used it was in center times. I feel like that’s ... been the schedule in this classroom. That’s really the only appropriate time to do it, ’cause, like, when we’re doing the art activity, you can’t sit beside someone and, then, like, do it.

When asked why she was unable to apply the intervention strategies the other times, Lily reported the lead teacher in her classroom would not allow her to do so. Later in the intervention phase of the study, she discussed how the feedback provided to her during coaching is applied without my presence:

I’ll just remember. I’ll just like hear your voice in my head. I feel like I’ll remember what you said to me And, like, even though I won’t have you, like, necessarily right there telling me what to do, I’ll be, like, I remember Laura said to do this when you’re doing this and stuff like that.

Diana also discussed how she applies the BIE feedback at different points throughout the intervention process. In the first week she reported when I am not there she practices following the lead and providing 1-2 word responses with all of the students in her classroom and thought it was helpful to them. In the second week she reflected on her interactions with her target child before my arrival:

I have been trying to use it throughout the day. Like, this morning before you got here, I used “roll” and ... he finally said “roll” back to me and I said “good” and I said “roll ball” and I added something to it, but he just kept saying “roll” and he threw it (laughs). ... But I saw that and am gonna try to use it with the other kids too. But, whenever I am with (target child), I try to keep it constant. So, he becomes more used to it.

During the last week of the intervention, she continued to describe ways that she is trying to listen more closely to all of the students in her classroom. In particular, with her target child, Diana reported that she expands Jeffrey’s communicative acts, and believed doing this continuously was helpful to him.
Overall, the data indicated that the pre-service teachers found use of BIE feedback to be a valuable and positive experience. The pre-service teachers did stress that it was important for a coach and pre-service teacher to have a shared understanding about how much feedback should be provided and that a partnership was key. Specifically, the partnership should be a supportive one in which the coach demonstrates an understanding of the pre-service teacher’s emotions and knows when to provide feedback and when to step back. Furthermore, they found BIE feedback to be useful in knowing what to do at a given moment and the pre-service teachers indicated they found the strategies useful by applying them when the coach was not in the classroom.

Research Question 2

The second question addressed challenges the pre-service teachers perceived from using the bug-in-the-technology to receiving coaching during practicum. Four themes were developed to address this question: (a) background noise/technical issues, (b) concerns about other students needing attention, (c) feeling overwhelmed, and (d) concerns about student reactions to the pre-service teacher wearing the Bluetooth.

Background Noise/Technical Issues. All three of the pre-service teachers discussed that the background noise and difficulty hearing me was a complicating factor in using the Bluetooth. Diana brought this to my attention prior to beginning the session one day and we were able to address this by increasing the volume. In particular, this was challenging when a child from another classroom screamed and cried for almost the duration of our session one day. At the conclusion of the study, she also admitted, despite being very positive throughout the duration of the study, the headset was uncomfortable.
at times. “Just with the feedback…just the extra noise in the background. That was really, it was uncomfortable.”

During the weekly interviews, Suzanne repeatedly mentioned “it’s a lot” in describing trying to listen to the Bluetooth and hearing the noise in the background of her class. Lily also reported that background noise makes it challenging to hear me. “I think it might be the Bluetooth, I can’t always hear you very well, which is why sometimes I’ll be, like, ‘what’.”

**Concerns about Other Students Needing Attention.** Two of the pre-service teachers, Lily and Suzanne, discussed concerns about the headset and other students in the classroom. On two different occasions, Lily discussed how the presence of other students complicated effectively using the headset. In one example, she reported:

> It was a little worse than it usually is just ‘cause that other little girl was over there and she’s loud. And, so, like, trying to listen to her, every time you would talk she would, like, scream basically (laughs). And, so, I feel like, something like that should maybe be done in, like, smaller group.

While Suzanne acknowledged that other things in the classroom required her focus, she believed it would be better to use the BIE with multiple children at once.

**Feeling Overwhelmed.** Two of the pre-service teachers, Lily and Suzanne, indicated they felt overwhelmed by using the Bluetooth. Lily shared her feelings of being overwhelmed during the first two weeks of the intervention. Although she said it was helpful, she also reported:

> To me, it’s just kind of, intrusive, I guess. Um, I don’t know, I’m so, used to, like, thinking to myself, what am I gonna do? So, like, having my own thoughts and, then, like, having somebody else telling me what to do, it’s just, I don’t know, it’s just kind of distracting. But I feel like I’m able to overcome it. And do what you tell me to do (laughs).
During the second week of the intervention, she continued to express feeling overwhelmed with the use of BIE:

I don’t like it. It’s just awkward, I don’t know. It just kind of stresses me out ‘cause I’m, like, OK, I’ll be going to say something and you’ll be, like, “try this” and I’ll be, like, “Whoa! Wait! What was I gonna say?” (laughs) It just, I feel like I’m trying to do too much.

Suzanne repeatedly stated “it’s a lot” when asked about her perceptions of BIE and during one of the weekly interviews reported “having something in my ear is, like, really overstimulating.”

Concerns about Students’ Reactions to Seeing a Bluetooth. Two of the pre-service teachers, Lily and Diana, admitted they were initially concerned about how the students in their classrooms would react to seeing them wear a Bluetooth. However, both were able to quickly address this with students. In one instance, Lily reported she was not sure about what to tell her students and she would need to have a quick response. One day during the intervention, the students asked her about the Bluetooth and she responded:

I think I told them it was an earring. And they were, like, “Oh, OK. That’s a weird looking earring, but OK.” And, then, they asked me about it one day when you weren’t in there and I wasn’t wearing it and I was, like, “Yeah, now, see I’ve got these earrings on.”

Diana also expressed concerns students would want to wear it and how she addressed it. None of the students in her class wanted to wear the Bluetooth, but her target child pulled it out one day and she described how she addressed the scenario. “I was, like, ‘No, that goes there’ and he was, like, ‘OK’.”

Overall, the data indicated that some challenges were associated with the use of BIE feedback. All three of the pre-service teachers described difficulties hearing feedback and the background noise of the classroom was problematic. Two of the pre-
service teachers stated using a headset was overstimulating and distracting. Further, they found it challenging to attend to the needs presented in a classroom with multiple children; however, one of the pre-service teachers put forth that using BIE feedback may be easier if coaching addressed the needs of several students instead of just targeting one. Finally, although two of the pre-service teachers initially had concerns about how their students would react to seeing the headset, these concerns were quickly resolved and the students found it to be only a minor distraction for a very short amount of time.

**Research Question 3**

The third question examined how coaching affects pre-service teacher use of responsive interaction (RI) strategies. Prior to this study, the pre-service teachers who participated in this study all had varying degrees of exposure to coaching, experience facilitating language development with young children, and working in early childhood settings. When this study began, Suzanne was the only one of the three participants who had received individualized support and training in promoting language skills with young children and had the most experience being coached. In comparison, while Diana had experience being coached, she had not received specific instruction on how to be a coach, and the youngest children she had worked with were (prior to enrolling in the Birth through Kindergarten program) in kindergarten. In contrast, Lily had never been in an early childhood setting until her first practicum placement when she enrolled in the Birth through Kindergarten program and her one experience in being coached was considered negative. Finally, as noted earlier, only post-observational data were collected on Diana and Lily; therefore, results and analysis will only be provided on these two pre-service teachers.
Over the course of this study, the pre-service teachers were coached on the use of three RI strategies in their practicum placements. A review of these strategies will be provided. Mirroring and mapping is a strategy in which the adult imitates the child’s action immediately after it happens, and provides a label to describe the action or object being used. This is a form of turn-taking that is especially relevant when children do not take many verbal turns to help create balanced turn-taking between the dyad. In addition, it serves as a reminder for the adult to remain engaged in the child’s play.

Target talk is a strategy in which the adult models different types of language that can sometimes involve the use of specific word combinations. The adult is coached to model statements rather than questions and the goal is to have 50% of the adult’s communicative acts be at the child’s target level and the remainder of communicative acts be slightly above the targets. Moreover, when modeling language, the adult uses action words rather than helping verbs in promoting the use of rich, descriptive language.

The use of expansions involves adding 1-2 words onto the child’s communicative act. Communicative acts that may be expanded can include the child’s use of gestures, single-words, or multi-word phrases. If a child says a word that is unintelligible, that is not considered an opportunity to expand the child’s language.

The two tables below (see Table 5.2 and Table 5.3) were created from data collected by coding the first ten minutes of the transcripts obtained from the pre- and post-videotaped observations. Guidelines for transcribing and coding the data are provided in Appendix D. As a reminder, the targets Diana modeled for Jeffrey were at the 1-word level; therefore, her use of 1-word phrases during the initial observation was slightly elevated. Additionally, once targets were selected and she began working on modeling
target talk during the intervention, saying 1-word phrases is often considered easier than modeling multiple-word phrases continuously for a set period of time. Data obtained in pre-and post-videotaped observations indicate a considerable increase in Diana’s use of mirroring and mapping strategies, use of target talk, and a moderate increase in her use of expansions. Additionally, Diana demonstrated a decrease in the number of questions she asked, which was one of the goals in using target talk during interactions with Jeffrey.

Table 5.2

<table>
<thead>
<tr>
<th>Diana’s Use of RI Strategies</th>
<th>Observation 1</th>
<th>Observation 2</th>
<th>Post Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirroring and Mapping Strategies</td>
<td>1</td>
<td>0</td>
<td>64</td>
</tr>
<tr>
<td>Target Talk</td>
<td>14</td>
<td>7</td>
<td>57</td>
</tr>
<tr>
<td>Language Slightly Above Target Level</td>
<td>8</td>
<td>2</td>
<td>43</td>
</tr>
<tr>
<td>Number of Questions Asked</td>
<td>37</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>Number of Communicative Acts</td>
<td>165</td>
<td>107</td>
<td>143</td>
</tr>
<tr>
<td>Expansions – Used/Number of Opportunities to Expand</td>
<td>0/15</td>
<td>1/20</td>
<td>8/22</td>
</tr>
</tbody>
</table>

In comparison, the targets Lily modeled for Kendrick were at the 4-word level. Modeling all language using a minimum of four words for each communicative act, including the use of action words, over the course of several minutes can be challenging. Further, Lily’s skills as a communication partner in being conversational and showing an interest in Kendrick’s play through the use of questions lie in contrast to the responsive nature of these language intervention strategies. Similarly, expanding the language of someone already using multiple-word phrases is equally challenging. In comparing data
collected from pre- and post-videotaped observations, a very slight increase in the use of mirroring and mapping strategies and target talk was observed, as well as a moderate increase in Lily’s use of expansions and moderate decrease in the number of questions Lily asked.

Table 5.3

<table>
<thead>
<tr>
<th>Lily’s Use of RI Strategies</th>
<th>Observation 1</th>
<th>Observation 2</th>
<th>Post Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirroring and Mapping Strategies</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Target Talk</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Language Slightly Above Target Level</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of Questions Asked</td>
<td>83</td>
<td>87</td>
<td>34</td>
</tr>
<tr>
<td>Number of Communicative Acts</td>
<td>144</td>
<td>174</td>
<td>139</td>
</tr>
<tr>
<td>Expansions – Used/Number of Opportunities to Expand</td>
<td>0/64</td>
<td>2/87</td>
<td>13/43</td>
</tr>
</tbody>
</table>

As an additional point of analysis, the pre-service teachers were given a questionnaire (see Table 5.4) after completing all of the intervention sessions to gather information related to how this intervention helped them facilitating language intervention strategies when BIE was used. This questionnaire differs from the pre- and post-questionnaire discussed earlier due to a greater emphasis on the facilitation of language development and specific strategies taught during this study versus how BIE can be helpful for teachers and their teaching ability. While at least two of the three pre-service teachers rated they moderately agreed BIE feedback was helpful in their communication strategies and helping them facilitate language development, all three of
the questions related to use of the specific language strategies taught were rated as strongly agreed by two of the pre-service teachers.

Table 5.4

<table>
<thead>
<tr>
<th></th>
<th>Pre-Service Teacher’s Ratings of BIE and Use of RI Strategies</th>
<th>Diana</th>
<th>Suzanne</th>
<th>Lily</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Overall, how helpful was the bug-in-the-ear feedback for your communication strategies?</td>
<td>SA</td>
<td>MA</td>
<td>MA</td>
</tr>
<tr>
<td>2.</td>
<td>How helpful was the bug-in-the-ear feedback in helping you facilitate language development?</td>
<td>MA</td>
<td>SD</td>
<td>MA</td>
</tr>
<tr>
<td>3.</td>
<td>How helpful was the bug-in-the-ear technology in encouraging you to use matched turn taking with your students?</td>
<td>SA</td>
<td>SA</td>
<td>MA</td>
</tr>
<tr>
<td>4.</td>
<td>How helpful was the bug-in-the-ear technology in encouraging you to use target talk with your students?</td>
<td>SA</td>
<td>MA</td>
<td>SA</td>
</tr>
<tr>
<td>5.</td>
<td>How helpful was the bug-in-the-ear technology in encouraging you to use expansions with your students?</td>
<td>SA</td>
<td>MA</td>
<td>SA</td>
</tr>
<tr>
<td>6.</td>
<td>How prepared did you feel to use the bug-in-the-ear technology?</td>
<td>MA</td>
<td>MA</td>
<td>SD</td>
</tr>
</tbody>
</table>

Note. BIE = bug-in-the-ear; SD = Strongly Disagree; MA = Moderately Agree; SA = Strongly Agree

In addition, when comparing this rating skill to the pre-and post-questionnaires used to gather the perspectives of the pre-service teachers ratings on the use of BIE technology, some similarities and differences were observed. For example, Diana’s favorable impression was consistent on each questionnaire she completed. In comparison, on the questionnaire described in Table 5.4, Suzanne noted she moderately agreed BIE feedback was helpful for her communication strategies. However, on the post-questionnaire she noted that she would not suggest BIE technology to other teachers and did not believe they would find it helpful in improving their teaching practices. Finally, on the post-questionnaire, Lily indicated she believed BIE would not help pre-service teachers improve their teaching abilities or practices, and that she strongly believed BIE
was a good way for pre-service teachers to enhance their teaching ability and become better teachers, which suggests she has mixed feelings about BIE technology. In comparison with ratings she provided in the Table 5.4 questionnaire, despite feeling as though more preparation on how to use BIE would have been helpful, Lily’s overall ratings were positive.

Overall, the data indicated modest changes in the pre-service teachers’ use of RI strategies; however, findings for this question were limited due to inability to collect all the data with each pre-service teacher. Similarities and differences in effects were noted for each pre-service teacher and this may be partially attributed to the different needs of their target child. Both Diana and Lily increased their use of expansions and decreased their use of questions; however, Diana demonstrated considerable increases in her use of the mirroring and mapping strategy whereas Lily implemented the strategy to a lesser extent. As noted earlier, this may be attributed to the more conversational nature she has when interacting with Kendrick due to his higher rate of verbal communication acts. Furthermore, due to the more challenging nature of modeling 4-word targets when compared to modeling 1-word targets, only a small number of Lily’s language was modeled at or above target level when compared with Diana. Finally, two out of the three pre-service teachers (different combinations) reported they strongly agreed BIE feedback encouraged them to use the three RI strategies, while two out of three pre-service teachers reported they felt prepared to use BIE technology and that it helped them facilitate language development.
**Research Question 4**

The fourth question examined any changes that were observed about the target child’s communicative acts over the course of this study. Transcripts from pre- and post-videotaped sessions of the target child and pre-service teacher playing during center-time were coded for: (a) the number of communicative/play acts the target child used, (b) the number of play actions used (that were imitated by the pre-service teacher), (c) the number of communicative acts below the child’s target level, (d) the number of communicative acts that were not considered targets, and (e) the number of communicative acts that were at the child’s target level. Only the first ten minutes of these three observations were coded. Further, due to the inability to collect post-data with Suzanne and Daniela, only Jeffrey and Kendrick’s data were examined (see Table 5.5 and Table 5.6).

During Jeffrey and Diana’s first two observations that took place before intervention began, most of his communicative acts consisted of the use of “others” (i.e., “wow,” “yay,” etc.) or vocalizations that could not be identified as a specific word. He also communicated through gestures, such as using a reach, show, or point. In the first observation, Jeffrey made 32 communicative acts; 31 of those were coded as below his target level of 1-word phrases using either a noun, verb, protoverb, or request word, and the remaining communicative act was at the target level. The second observation yielded similar results. Jeffrey made 29 communicative acts; 25 were below the target level, three were at his target level and one was a play action imitated by the pre-service teacher in his classroom. After the intervention ended and post-data was collected, Jeffrey made 131 communicative or play acts during the 10-minutes that were coded. Fifty-seven
communicative acts were coded below the target level, seven were at the target level, 61 were play actions imitated by the pre-service teacher, and six were communicative utterances coded as not being at his target level. Examples of words coded as “not at target level” included Jeffrey counting.

Table 5.5

<table>
<thead>
<tr>
<th>Jeffrey’s Communicative Acts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Observation</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>2</strong></td>
</tr>
<tr>
<td><strong>Post Observation</strong></td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Total Number of Communication/Play Acts</td>
</tr>
<tr>
<td>Number of Play Actions (Imitated by Teacher)</td>
</tr>
<tr>
<td>Number of Communicative Acts Below Target Level</td>
</tr>
<tr>
<td>Number of Communicative Acts Not Considered Targets</td>
</tr>
<tr>
<td>Number of Communicative Acts at Target Level</td>
</tr>
</tbody>
</table>

During the first two observations with Kendrick and Lily, Kendrick demonstrated his ability to use a range of words in his vocabulary. For example, he used several pronouns (she, it, my, her, herself, etc.), a conjunction (and), contractions (I’m, didn’t, don’t), articles (the, a), and several adjectives (little, red, blue, green, etc.). Kendrick frequently used head nods and other gestures such as show, reach, give, and point to communicate. In the first observation, Kendrick made 87 communicative acts; 62 were below his target level, 19 were not considered to be at his target level, and six were at the target level for him. As previously noted, Kendrick’s targets were using a 3-5 word phrase that contains a preposition, a 3-5 word phrase with a modifier, and a 4-word
request. If Kendrick used any of these targets with a couple of additional words, this was coded as being at the target level. During the second observation, Kendrick made 123 communicative acts; 84 were below the target level, 18 were at the target level, and 21 were coded as not being at the target level. After the intervention ended and post-data were collected, in the final videotaped observation, Kendrick made 81 communicative acts. Forty-nine of these communicative acts were below the target level, eight were at the target level, 18 were coded as being not at the target level, and six were play actions imitated by Lily.

Table 5.6

<table>
<thead>
<tr>
<th>Kendrick’s Communicative Acts</th>
<th>Observation 1</th>
<th>Observation 2</th>
<th>Post Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Communication/Play Acts</td>
<td>87</td>
<td>123</td>
<td>81</td>
</tr>
<tr>
<td>Number of Play Actions (Imitated by Teacher)</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Number of Communicative Acts Below Target Level</td>
<td>62</td>
<td>84</td>
<td>49</td>
</tr>
<tr>
<td>Number of Communicative Acts Not Considered Targets</td>
<td>19</td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td>Number of Communicative Acts at Target Level</td>
<td>6</td>
<td>18</td>
<td>8</td>
</tr>
</tbody>
</table>

Overall, the data indicate mixed results on the impact of RI strategies for children participating in this study. As previously stated, Jeffrey was an ideal candidate for this study and, although changes in his communication skills can be attributed to maturity, there were indications that his communication skills improved during the course of the study. His rate of communicative acts increased considerably and his affect suggested he
enjoyed Diana following his lead during her use of the mirroring and mapping strategy. In contrast, Kendrick demonstrated a high rate of communication from the onset of the study and that remained. He also had a large vocabulary. As a result of these factors, little room was left to show growth over the course of this study. Furthermore, Lily did not implement the mirroring and mapping strategy quite as frequently as Diana and turns for play actions were not as high as those Jeffrey demonstrated. Anecdotally, both Jeffrey and Kendrick appeared to enjoy interacting with their communication partner due to sustained engagement in the activities, their long attention span, and smiles shared with their pre-service teachers.

**Summary**

Findings from this study indicate that despite feelings of being overwhelmed and the noise of the classroom affecting the quality of BIE feedback provided during some of the coaching sessions, overall, the pre-service teachers who participated in this study found BIE coaching to be valuable and helpful to them. Furthermore, there were some indicators that at least two of the pre-service teachers were able to apply some of the RI strategies independent of BIE coaching at the end of the study. In addition, mixed results were found in observations of how the target children’s communicative acts may have changed over the course of the study. Chapter 6 describes a discussion of the findings, as well as limitations of the current study, and implications for future research.
CHAPTER 6

Discussion and Implications

In this study, three pre-service teachers enrolled in their second semester in a Birth through Kindergarten program at a large, public university shared their perspectives on implementing responsive language intervention strategies while receiving coaching through the use of a Bluetooth headset in their practicum placement. In using the symbolic interactionist perspective to examine their view, four tenets of SI were applicable to this study.

**Tenet 1.** *Language and interpretation are closely aligned (Prasad, 2005).* With this tenet, the focus is on understanding the perspective of one another and how to develop a rapport between the coach and pre-service teacher. In particular, how the pre-service teachers interpreted what I said to them was integral to how they felt about being coached, as well as their ability to demonstrate use of the language intervention strategies used in this study. As put forth by Brown and Woods (2016), the relational aspect of coaching is important and needs to be a priority. In my opinion, I believe I had a very good relationship with the pre-service teachers and tried to be very conscious of using positive language and phrasing things in a way to let them know their perspective was valued. For example, I might say, “the next time he does ______, you could consider saying _____.”

I also looked for opportunities to praise them on their use of a variety of skills, both focusing on their use of RI strategies and other skills, such as their use of specific
praise. During our “setting the stage” and “reflect and review” sessions (Friedman & Woods, 2012; Friedman & Woods, 2017), we laughed often and I shared previous experiences I had in working with children, learning this intervention, being coached, and how I learned to coach others. These interactions helped to establish a rapport between a coach and trainee that has been suggested as integral when coaching others (Barton, Kinder, Casey, & Artman, 2011). Opening up yourself to others helps form a connection and build a rapport with someone. Hearing someone tell you how to interact with another person is not a normal experience for many adults and feeling safe and comfortable with someone coaching you is critical to the success of the intervention being coached.

As this study began, I encouraged the pre-service teachers to let me know if something I did made them uncomfortable or to let me know if I provided too much feedback. Based upon feedback they provided, it appeared as though they felt comfortable letting me know what they liked and didn’t like, but there is always the possibility that they may have been more open discussing their perceptions with another interviewer. I also tried to be cognizant of their body language, if they appeared tense or relaxed, and let that serve as an indicator about when to provide feedback and went to hold back until a challenging moment ended. Additionally, although I can’t say I did this as much I should have, I tried to remember that not everyone is comfortable with feedback and coaching and some of the pre-service teachers have not had positive coaching experiences.

Tenet 2. When we interact with each other we have to consider what our partner is getting ready to do or is already doing (Blumer, 1969). This tenet was applicable to the study due to the emphasis placed on facilitating language development. Specifically, the
use of the mirroring and mapping strategy, as well as the expansion strategy was integral
to this tenet. Pre-service teachers were coached to imitate the target child’s action and
map language onto that action; in addition, the pre-service teachers were coached to
expand the child’s communicative acts. Moreover, how the coach provided immediate
feedback to the pre-service teacher was relevant to this study.

How the pre-service teachers demonstrated their understanding of this tenet evolved over the course of the study in different ways. Similar to the participants in the study conducted by Ottley, Coogle, and Rahn (2015), pre-service teachers in this study appeared to find value in the communication strategies they implemented. Details about how this was applicable for each of the pre-service teachers will be provided. From the onset of the intervention, Diana discussed that her interactions affected language development as they tried to keep the interactions play-based and she was trying to listen more closely to Jeffrey’s vocalizations because she believed they were intentional and had meaning to them. As the study reached its conclusion, she referenced the power in using the expansion strategy. “Today whenever he would just say ‘wow’ or ‘oh’ and if you expand on it, he responds to it. We’re just really learning more and more about him every day.” As Diana listened to the words Jeffrey used, and expanded his language, she demonstrated her consideration of what he was doing and how he was trying to communicate.

While Diana’s descriptions of her interactions with Jeffrey indicated she found the use of the expansion strategy to be powerful and salient in connecting with him, Suzanne’s discourse suggested the mirroring and mapping strategy was eye-opening and helpful in making connections with Daniela. During the first week of the intervention,
Suzanne reported that “today she talked more ‘cause I was talking so I think that is increasing her language.” These statements may indicate Suzanne initially thought that modeling language for Daniela to use was powerful and would help promote language development.

After admitting that the mirroring and mapping strategy did not initially feel natural to her, at the conclusion of the study, Suzanne shared, “well, I think she’s become more imitative and she talks to me more when I play with her. I don’t really, like, have to get her to talk, she’ll just talk naturally.” Suzanne’s comments that Daniela spoke more when Suzanne played with her suggest she may have recognized that she didn’t have to work to get Daniela to communicate, and there was a natural process to support Daniela’s communication skills without placing demands on her that encouraged communication between the dyad. Furthermore, as the study concluded, Suzanne also observed that Daniela was “imitating more and … describing things more so than she was before.”

From the onset of this study, Suzanne stated that Daniela had the ability to communicate; however, providing her space and responding to her may have been a new concept in thinking about how to build upon what the child is doing in the moment. This shift in thinking about communication may indicate Suzanne perceived some value in learning language intervention strategies that may be different than those she learned in working with a speech-language pathologist and at a speech therapy camp. Moreover, it also indicated Suzanne began to view her role as responding to Daniela’s actions and what she was doing rather trying to guide Daniela’s language and communicative acts.

In terms of how Lily demonstrated her awareness of responding to Kendrick, this was an ongoing struggle. Interacting with Kendrick was fun, but challenging. At certain
points during the intervention, by the time I provided feedback to Lily about how to interact or respond to something he did, he had already moved on to something else:

I try to listen to it, and, like, do it as best as I can, but I feel sometimes I don’t necessarily do what you tell me, like, because we’ve already moved on to something else, which is, like, another thing, Cause, like, you tell me to do something after we do the, what we were doing. Kendrick’s probably moved on because Kendrick, like, moves on pretty quickly.

During the first week of coaching, Lily and I discussed how Kendrick likes to have possession of the materials and tries to control the play between the two of them. As she began to learn strategies for addressing this, Lily indicated awareness of recognizing facial expressions and behaviors:

He also uses a lot of eye contact to show, like, facial expressions to show that he’s happy or he’s not enjoying something. Um, he has, different, like, inflections in his voice, and you can, like, tell...he’s not happy...when you take a puzzle piece when he does not want you to take the puzzle piece.

As the intervention continued, this is something we continued to work on to an extent, but was never the primary focus. Managing materials and becoming more comfortable in her interactions with Kendrick was something Lily demonstrated improvement on and was also aware of how Kendrick’s play partners affected his behaviors.

An additional way this tenet was relevant to the study was considering how the coach provided immediate feedback to what the pre-service teacher was doing. As previously noted, due to how quickly Kendrick moved from one thing to another, this was challenging at times. Two of the pre-service teachers provided their interpretation on how immediate feedback was helpful. This finding is similar to previous studies in which participants provided favorable reports regarding the use of BIE feedback and that is was valuable (Ottley et al., 2015; Ottley, Coogle, Rahn, & Spear, 2016). One of the pre-service teachers, Suzanne, observed, “the more specific, the better. Like, whenever you
would say something that I could immediately use, that was really helpful because I could see how I could do it different in other situations.” The other pre-service teacher, Diana, indicated her appreciation of extra feedback. “It was also really helpful to have … those second pair of eyes and second pair of ears to make suggestions on which … strategies I should be doing at the time. There really wasn’t anything not helpful.” Thus, perceptions shared by the pre-service teachers indicate some benefits may be associated with the use of BIE feedback.

**Tenet 3. Interaction occurs between people rather than their roles** (Adams & Sydie, 2002). Initially, it was anticipated that this tenet was applicable to the study in two aspects: (a) pre-service teachers focus on how to become a communication partner with their target child through the use of RI strategies, and (2) immediate feedback is pertinent to the relationships between the coach and pre-service teacher. Thus, coaching may have affected the pre-service teacher’s use of RI strategies in that the pre-service teacher becomes a better listener to the target child and got to know him or her better throughout the study.

At different points during the study, each of the pre-service teachers made comments that indicated growing awareness of seeing their target child as people they had a special relationship with and they got to know their personalities well. For example, Lily discussed Kendrick’s sensitivity and feeling of being uncomfortable the day that the Easter Bunny came to the school. Suzanne also observed ways that Daniela grew more comfortable with her, despite her reserved nature, over the course of the study and she saw a more assertive side to her personality. Finally, Diana enjoyed Jeffrey’s independent
nature and was proud of the way he grew in his language and social skills throughout this study.

While each of the pre-service teachers stated they felt the coaching and feedback was helpful, two provided ways in which the coach worked with them and indicated a collaborative relationship. This finding aligns with Israel, Carnahan, Snyder, and Williamson’s (2012) observation that coaching within classroom environments may be beneficial as it allows the teacher to receive support and feedback in relation to her specific classroom and use of instructional strategies. For example, Lily shared that she appreciated having someone willing to work with her when she was frustrated, someone who was encouraging, and the ability to individualize the feedback for the person being coached were all important qualities for a coach to possess. Similarly, Diana reported that she, “liked the … looseness of the suggestions and that ‘you can maybe do this or something like that’ instead of ‘say this’ (laughs) because I think it left some room for, for a kind of personal thing.” These statements may indicate the pre-service teachers viewed the coach made attempts in developing the relational aspect of coaching.

Tenet 4. Interpretation: (a) the “actor” realizes that things have meaning, and (b) the “actor” chooses, re-frames, and interprets meanings in reference to his/context in a particular moment (Blumer 1969). As previously noted, the use of target talk in modeling salient language as pre-service teachers promote language development is an important strategy in helping build their student’s vocabulary and develop more sophisticated language skills. In addition, the use of expansions as a language intervention strategy involves listening and adding on to the child’s language. Thus, this tenet helps address how coaching may support the pre-service teachers in the use of RI strategies.
As the intervention progressed, the target talk and expansion strategies were introduced in the middle and final weeks of the study. During the weeks that the pre-service teachers were coached on how to implement these strategies, the pre-service teachers provided observations about how their target child communicated and how their language served as a model for the target child. For example, Lily spoke extensively about this concept. On one occasion she shared concerns that she did not believe the lead teacher in her classroom provided developmentally appropriate language to the students and her interactions made her “feel like doing this gives him a chance to get more of that.” Moreover, the use of the RI strategies, “models… how he needs to be talking in more complete sentences.” Lily went on to say that this experience changed her interpretation of how to interact with students:

It helped a lot… I was thinking about it and the more I thought about it, you know, I didn’t, you know, all I did was ask questions before we started doing this (laughs). Well, not like all I did. But, like, the majority of my interaction was just asking questions to kids and I, you can’t do that, like, all the time. Like, it’s good just if you’re, like, asking them to see if they’re learning. Like, they’re learning opposites right now and so, maybe when I’m asking questions, that’s what I want to focus on, but… just the different strategies you’ve taught us. Like, I was aware of them, but I never actually, like, used them before.

Over the course of this study, Diana referenced her growth in the realization that Jeffrey was intentional in his communicative acts and described the growth he displayed while participating in this study. During our conversations, she described examples of how hard she was listening to him to interpret what he was trying to convey:

I definitely apply it to whenever I’m just working around Jeffrey or with other kids. I’m being more responsive, again, to, uh, what he’s trying to say and, again, listening a little harder than, even harder for what he’s trying to say and expanding on it and clarifying and I think that’s helping and I’ve been trying to do that every time I’m there.
These efforts coincided with some growth in his language development. When this study began, she reported he primarily communicated through the use of sounds with few words. At the conclusion of this study, she reported the vocalizations were sounding more like words and his means of communication was primarily through the use of words. Furthermore, she described instances in which she expanded his language and he used new words during my observations and at times when I was not in the classroom. These observations align with findings reported by Ottley and Hanline (2014) in which participants shared that BIE coaching reminded educators to use communication strategies and to know what to target in working with students.

**Conclusions**

This study extended the previous research conducted on the use of BIE technology in early childhood settings. The perspectives provided by the pre-service teachers, through the Likert-scale questionnaires and interviews, participating in this study align with previous findings (Ottley & Hanline, 2014; Scheeler, Ruhl, & McAfee, 2004; Scheeler, McKinnon, & Stout, 2012) that the use of immediate feedback helps them implement effective teaching strategies in the moment. Further, the pre-service teachers reported BIE technology was useful in immediately addressing any incorrectly used strategies. Although there is a small amount of quantitative research that exists pertaining to the use of BIE technology in coaching teachers to facilitate the use of expressive language skills, this study provided a qualitative approach to gather richer data on the perspectives of the participants.

Similar to previous research (Ottley & Hanline, 2014), the pre-service teachers in this study reported background noise was problematic in using BIE coaching. This study
also aligned with findings from Ottley and Hanline’s study (2014) regarding variable outcomes in the educator’s ability to expand language and follow the child’s lead. Pre-service students in this study, similar to participants from Ottley, Coogle, and Rahn (2015) study, found the feedback helpful, but also noted that BIE was difficult to use when classrooms had a busier environment. However, this study differed in that some participants in this study did state the use of BIE was overwhelming and overstimulating. Despite this, it should be noted that at least one of the pre-service students, Lily, reported despite being overwhelmed, she felt like she was able to overcome it.

Findings from this study also provide information that some language intervention strategies may be easier to implement in a classroom than others. For example, it was very easy to coach the pre-service teachers on using the mirroring and mapping strategy because I did not have to hear what the target child was saying; I could simply observe the interactions, notice if the pre-service teacher was mirroring the child’s actions and could hear her map language through the headset. Likewise, I could hear the pre-service teacher model language at the child’s target level and coach her on specific words or phrases to model, that her utterances were statements rather than questions, and that she modeled all of the child’s targets during the coaching session. In contrast, in classrooms that were busier, it was often difficult to hear what the child was saying and to coach the pre-service teacher on how to expand the child’s verbal communication acts.

With the focus that was placed on the use of responsive intervention strategies, it was interesting to note how one of the pre-service teachers picked it up rather easily and two others had more challenges. Several factors may have contributed to this. Diana’s classroom had fewer students and less noise; although a couple of students were curious
about the camera and explored the area where Diana and Jeffrey played, in some of the coaching sessions, they were virtually undisturbed by other students. Being able to provide somewhat undivided attention to the child while being coached was certainly an advantage for Diana. In addition, her personality and lack of training on the facilitation development may have been the most suitable for the implementation of these strategies. She was quiet and reserved when interacting with Jeffrey; thus, the need to coach her in making statements rather than questions was not needed quite as much as with the other two pre-service teachers. Finally, Jeffrey’s developmental levels were the most appropriate for this intervention. He needed extra support and, when Diana provided it, Jeffrey acquired more words; thus, it may have been reinforcing for her to continue practicing these strategies throughout the day. She was also in a classroom where the lead teacher seemed most welcoming and supportive to her in implementing these strategies.

In contrast, Suzanne and Lily both were in rooms with two other teachers and approximately 16 children on any given day. Although there was some benefit to the pairings (forming close connections, Daniela coming out of her shell in initiating more communication with Suzanne and myself, Lily growing more comfortable in using some behavior management strategies), the reinforcement that Diana likely received in noticing real growth in language acquisition did not occur with Daniela and Kendrick. Furthermore, Suzanne and Lily had some different experiences in learning about naturalistic language intervention strategies than Diana did. In my opinion, hearing the testimonials and seeing someone model how to implement the RI strategies would have been helpful in both of them getting a better understanding of what the intervention looks like with effective implementation.
Lily and Suzanne were also alike in that they asked a high rate of questions and took a high number of communicative turns during the initial observations. Pre-service teachers of young children sometimes believe that the way to teach children is through direct instruction and the way to determine what they know is by asking them questions. This may have influenced the communication styles depicted by Lily and Suzanne in the pre-observational sessions. Although Suzanne has more of a reserved personality, Lily is very outgoing and asks questions as a way of being a good conversationalist. At the onset of this study, I noted that she was curious and partners with children by inquiring about their interests rather than engaging in the play. Suzanne’s style may have also been influenced by her experiences in working in a speech therapy camp and with a speech-language pathologist. She provided support by pairing words with gestures, but also asked questions to determine Daniela’s understanding of language. Further, although the lead teachers in Lily and Suzanne’s classrooms were welcoming and a huge help in selecting target children and getting parents to complete paperwork, neither Lily nor Suzanne shared ways that they collaborated with the teachers about supporting language development or how they felt they could implement the strategies across the day in the routines as Diana did. Finally, due to the nature of this classroom and a higher child to adult ratio, both Lily and Suzanne needed to attend to other students. Therefore, they rarely had the opportunity to receive BIE feedback and just focus on their target child.

Study Limitations

Starting this study late in the school year put a rush on its completion, and the brevity of this study was a factor in being unable to collect post-observational data from Suzanne and Daniela. Although I believe, through anecdotal notes, that Suzanne
demonstrated increased use of RI strategies over the course of the study, having data to support this belief could have strengthened findings from this study. In addition, having 1-2 weeks longer could have allowed for some flexibility in how much time could have been spent coaching the pre-service teachers on using some of the strategies. For example, the concept of mirroring and mapping presented as quite a shift in how Suzanne and Lily initially interacted with their target children during pre-observational sessions. Further, due to the challenge of modeling 4-word targets in a classroom environment, having extra coaching sessions could have helped Lily in implementing this strategy correctly and with greater frequency.

A second limitation was not seeking more information from pre-service teachers about using the Bluetooth headset. We often have an assumption that when our pre-service teachers are in their early twenties they may be more comfortable with technology than we are and have used a wider range of technology. In this study, none of the pre-service teachers had used a headset before we started the intervention and they all rated their preparation of using BIE and how helpful it was in facilitating language development lower than other questions such as how it helped them use the specific language strategies. Getting more information from the pre-service teachers may have been useful. An additional question about their rating is whether it was the headset that made two of the pre-service teachers feel overwhelmed or if it was simply being coached. In the initial interviews, Suzanne reported that she sometimes has a hard time receiving feedback in the moment but is usually able to appreciate and apply it later:

I’m torn because I sometimes don’t respond as well to feedback in the moment because then I’m like, ‘oh, I did it all wrong and this is stressful.’ But sometimes that is good and I’ve become, I always, I always receive it well but sometimes it overwhelms me in the moment. But I really do appreciate feedback afterwards for
the future. Sometimes I respond better to afterwards for the next time. But, obviously, it’s important to, if you’re doing something wrong in the moment to say, ‘don’t do that’, but I like both.

Likewise, Lily acknowledged that she prefers written feedback over verbal feedback. “I sometimes will forget what somebody said to me in person so I like having it documented.” In addition to this, Lily stated her only coaching experience was with someone she did not consider to be nice.

A third limitation was that the pre-service teachers had different experiences in learning about responsive interaction strategies. For example, just prior to the study, Diana was in class for the entire Enhanced Milieu Teaching (EMT) presentation and heard more rationales about why the strategies can be effective. This class also had videos containing testimonials from teachers and parents about its efficacy, as well as a video of me coaching a parent on how to follow a child’s lead. Further, while I was making this presentation, the class had a very good and thorough discussion about the strategies and I believe that helped Diana buy into this intervention more than the other students. However, it should be noted that the climate of Diana’s classroom was much more conducive to learning this intervention due to the smaller number of students, less noise, and having the target child that was most suitable for this intervention.

Finally, although there is not a set number of participants required in a qualitative study, having the perspectives of more pre-service teachers could enhance and strengthen findings from this study. For example, as previously discussed, learning about whether or not pre-service teachers perceive the experience of being coached or the use of a headset while being coached may cause them to feel overwhelmed could be valuable. Having a
larger number of participants would help to determine whether this finding was unique to
the three participants in this study.

**Implications for Future Research**

This study provided some preliminary findings about ways that BIE may be
useful in supporting pre-service teachers in practicum placements. Four ideas for future
research will be discussed. For the first research idea, I would like to replicate this study
in other settings to examine if findings gained in this study would be consistent with
other pre-service teachers. Although there is not a set number of participants needed in
qualitative research, having more voices can make a stronger case for why something
does or does not work. I would also like to get more information on how pre-service
teachers believe they need more support in using BIE in a classroom and if concerns
addressed are related to actually being coached or the use of a headset.

Next, I would like to examine the implementation of all Enhanced Milieu
Teaching (EMT) strategies. As previously noted, despite the emphasis that was placed on
the use of responsive intervention language intervention strategies with young children,
additional coaching was needed to help the teachers in using environmental arrangement
strategies to create a context for communication. Designing a study that examined how to
support students on implementing each component of EMT over three practicum
placements could provide a very strong foundation in helping them develop stronger
skills in supporting language development. For example, during the first semester, the
focus could be on environmental arrangement (EA) strategies, the second semester would
focus on responsive intervention strategies (while still applying EA strategies), and the
third semester would continue EA and RI strategies as the pre-service teachers learned to
implement milieu teaching strategies successfully (and judiciously!). The focus of the study could examine which strategies were implemented most effectively with coaching, as well as examine how pre-service teachers perceive different aspects of coaching (setting the stage, immediate feedback, modeling, written or graphic feedback, and reflect and review).

A third topic to focus on for BIE would be how to promote the use of play in practicum settings. As observed in this study, little play occurred between the dyads. Although the pre-service teachers appeared to like the students, they did not engage in play activities at the child’s developmental level. Coaching pre-service teachers on how to identify the levels of play that students exhibit and how to scaffold them to use more sophisticated levels of play to support their language and social skills is an area that needs more research. Currently, research for BIE in ECSE has focused on communication and behavioral needs; applying BIE to other areas of development can be helpful and useful in supporting pre-service teachers to use developmentally appropriate practices with their students.

The fourth idea for a research study would be to examine the choice of words used when coaching pre-service teachers. For example, would the pre-service teacher prefer the use of code words to cue the pre-service teacher about what he/she should be doing or would she prefer having a longer description of how to apply a strategy? Further, how would either one of these types of feedback affect the relationship that exists between the coach and the pre-service teacher? Finally, along these lines, how do pre-service teachers feel about the relational aspect of coaching and do they deem it to be
important? The use of an ECHO smart pen to record the feedback used during the coaching could be an interesting way to collect data on how coaching is provided.

**Final Insights**

As noted in this study, a considerable gap in research exists on the use of BIE technology in early childhood settings. The goal of this qualitative study was to address that gap by learning how pre-service teachers feel about receiving BIE feedback in an early childhood classroom. Findings from this study indicate that despite feeling overwhelmed, pre-service teachers found the use of BIE feedback was helpful in implementing the RI strategies reviewed over the course of this study. However, future research should consider focusing on the quality of BIE feedback according to class size and strategies that may alleviate pre-service teachers’ feelings of being overwhelmed when receiving the feedback.
REFERENCES


Oliver, C. (2012). The relationship between symbolic interactionism and interpretive

Oliver, P. (2009). *The effects of an audio coaching intervention on parents’ interactions
with their children with autism* (Doctoral dissertation). Retrieved from ProQuest
Dissertations and theses database (UMI No. 3319728)

Findings from two studies implemented in inclusive early childhood

professional development on early childhood co-teachers’ use of communication
strategies. *Topics in Early Childhood Special Education*. Advance online

educators’ practices and associations with toddlers’ expressive communication.
*Journal of Early Intervention, 36*(2), 90-110.

Studies in Education, 8*(1), 5-23.

Powell, D.R., & Diamond, K.E. (2013). Implementation fidelity of a coaching-based
professional development program for improving head start teachers’ literacy and

with head start teachers. *Topics in Early Childhood Special Education, 30*(3),
148-161.


APPENDIX A: INTERVIEW GUIDE

List of Semi-Structured Questions (to be used before baseline)

1. Tell me about your experiences working in early childhood settings.

2. Tell me about any experiences you have had working with young children with disabilities in a professional and/or personal capacity.

3. Tell me about any trainings or classes you have participated in related to language development.

4. Define the term naturalistic language intervention for me.

5. Tell me about any experiences you have had with coaching (as the one doing the coaching or the one being coached).

6. Describe ways in which you have received feedback. What was helpful/not helpful?

7. How does your target child currently communicate?

8. What is your perception of bug-in-the-ear technology?
Weekly Interview Protocol for Pre-Service Teachers

1. How does your target child communicate?

2. What are you noticing/anticipating about his/her communicative acts?

3. How do your interactions with the target child have meaning?

4. How do your interactions affect the language development of the child?

5. Tell be about the BIE feedback you are receiving.

6. How are you able to apply the BIE feedback you receive when working with the target child?
List of Semi-Structured Questions (to be used after intervention ends)

1. Define the term naturalistic language intervention for me.

2. Tell me about the recent experiences you have had with coaching.

3. Describe ways in which you received feedback. What was helpful/not helpful?

4. How does your target child currently communicate?

5. What is your perception of bug-in-the-ear technology?

6. Was there a point in which the bug-in-the-ear technology felt or did not feel comfortable?

7. Tell me about that point in time.

8. What were techniques the coach did while providing immediate feedback that were or were not helpful?
APPENDIX B: POWERPOINTS

5/11/2017

MIRRroring AND MAPPING

Agenda
- On the assessment?
- How are the children?
- Questions from NF (powerpoint in Dr. Lynne's words?)

Mirroring and Mapping
- Mirroring: When the adult engages the child, the adult is seen as the child.
  (What does it mean to be engaged?)
- Mirroring: When the adult "mirrors" by looking at the child and the child is looking at the adult.

Why We Use Mirroring and Mapping
- Mirroring: Helps the child to see the adult is engaged.
- Mirroring: Helps the child to see the adult is engaged.

Why We Use Mirroring and Mapping (cont'd)
- Mirroring: Helps the child to see how the adult is interacting.
- Mirroring: Helps the child to see how the adult is interacting.

How and When to Mirror and Map
- Use mirroring and mapping when the child is not participating.
- Use mirroring and mapping when the adult is not participating.
- Make sure the child is engaged.
- Use mirroring and mapping when the child is engaged.
- Make sure the child is engaged.
- Use mirroring and mapping when the child is engaged.
Questions

- Public_KEY
- What is the role of key-based?
TARGET TALK

Agenda
- How was your week?
- How are you feeling?
- Any questions from our last coaching session?

Review from Last Coaching
- Remember, it takes time to make progress. Last week we discussed strategies to improve your engagement and collaboration.
- Moving and talking.
  - Seated, seated, standing, kneeling and walking.
  - This week, let's focus on incorporating those movements into our activities.

Target Talk
- How does your target child communicate now?
- Explore the use of visuals and gestures.
- Explore the use of tangible objects.
- Make sure the child is comfortable with the strategy.
- Encourage the use of symbolic objects.

Child's Targets
- Focus on specific goals to support the child's learning.
- A goal is to improve social skills.
- Practice making requests and sharing.

One Word Targets
<table>
<thead>
<tr>
<th>Target</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eat</td>
<td>Yes</td>
</tr>
<tr>
<td>Play</td>
<td>Yes</td>
</tr>
<tr>
<td>Talk</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

5/11/2017
EXPANSIONS

 Agenda

- Check for availability
- How are we doing?
- Questions from last session

Review from Previous Sessions

- Welcome and welcome: recap session
- Target task: what do you think is working?
- How often do we model the language?
- Questions about next session topics (how can we help?)

Expansions

- Discussion: listing good words to use in communication
- For next session: implement techniques discussed in last session

Why We Use Expansions

- Expansions: expands communication (by adding more words to enhance verbal communication)
- The more you can think of words and phrases, the more you can increase communication level.
- Expansions help you child learn new vocabulary and use in real-world situations.

How to Expand Communication

- Encourage verbal output: by asking questions and rephrasing the child's response
- Use clear, concise language: use simple words and short sentences
- Give plenty of feedback: use positive reinforcement and give credit for attempts
- Practice with everyday objects: use objects and situations that are familiar and relevant
Expansion Examples

- Visualization
  - Replace the word you want your child to remember with a word related to similar meaning, and ask the child what the new word means. This will help the child associate and remember the original word.

- Recite
  - Write down the words you want your child to remember, and then recite them with your child. This will help your child practice and remember the words.

- Read
  - Read the words slowly and clearly, and then ask your child to repeat them. This will help your child learn the correct pronunciation of the words.

- Plan for Session

  - Practice
  - Any questions?
APPENDIX C: LIKERT-SCALE QUESTIONNAIRES

Pre-Intervention Rating Scale (Adapted from Capizzi, Wehby, and Sandmel – 2010)

For each of the questions below, please circle the response that best characterizes how you feel about the statement, where 1 = Strongly Disagree, 2 = Moderately Agree, and 3 = Strongly Agree

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Moderately Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Using bug-in-the-ear technology will enhance my effectiveness as a teacher.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Most pre-service teachers would find the approach appropriate for helping pre-service teachers improve their teaching ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. The bug-in-the-ear feedback should prove effective in helping me improve my teaching ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. I would suggest the use of bug-in-the-ear technology feedback to other pre-service teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. Most pre-service teachers would find the bug-in-the-ear feedback helpful in improving their teaching practices.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. Most pre-service teachers would find the bug-in-the-ear feedback helpful in promoting language development of young children.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. The bug-in-the-ear feedback model is a reasonable way to help pre-service teachers become better teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. I like the procedures planned for use in the bug-in-the-ear model.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. The bug-in-the-ear technology sessions are a good way to help pre-service teachers enhance their teaching ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10. Overall, I believe engaging in the bug-in-the-ear feedback sessions will be good for me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Post-Intervention Rating Scale #1 (Adapted from Capizzi, Wehby, and Sandmel – 2010)

For each of the questions below, please circle the response that best characterizes how you feel about the statement, where 1 = Strongly Disagree, 2 = Moderately Agree, and 3 = Strongly Agree

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Moderately Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Using bug-in-the-ear technology enhanced my effectiveness as a teacher.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Most pre-service teachers would find the approach appropriate for helping pre-service teachers improve their teaching ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. The bug-in-the-ear feedback was effective in helping me improve my teaching ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. I would suggest the use of bug-in-the-ear technology feedback to other pre-service teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. Most pre-service teachers would find the bug-in-the-ear feedback helpful in improving their teaching practices.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. Most pre-service teachers would find the bug-in-the-ear feedback helpful in promoting the language development of young children.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. The bug-in-the-ear feedback model is a reasonable way to help pre-service teachers become better teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. I liked the procedures planned for use in the bug-in-the-ear model.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. The bug-in-the-ear technology sessions are a good way to help pre-service teachers enhance their teaching ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10. Overall, I believe engaging in the bug-in-the-ear feedback sessions was a good experience for me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Post-Intervention Questionnaire #2 (Adapted from Capizzi, Wehby, and Sandmel – 2010)

For each of the questions below, please circle the response that best characterizes how you feel about the statement, where 1 = Strongly Disagree, 2 = Moderately Agree, and 3 = Strongly Agree

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Moderately Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall, how helpful was the bug-in-the-ear feedback for your communication strategies?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. How helpful was the bug-in-the-ear feedback in helping you facilitate language development?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. How helpful was the bug-in-the-ear technology in encouraging you to use matched turn taking with your students?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. How helpful was the bug-in-the-ear technology in encouraging you to use target talk with your students?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. How helpful was the bug-in-the-ear technology in encouraging you to use expansions with your students?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. How prepared did you feel to use the bug-in-the-ear technology?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
APPENDIX D:

Transcription and Coding Guidelines

Guidelines for Transcription

Use parentheses for gestures (alone or paired with words).

Gestures coded: point, show, give, take, nods head, shakes head. Specifically, the actual gesture must be visible on the video. For example, if part of an arm is seen, we need to know for certain if a point or reach is used. In addition, only gestures directed towards the target child or pre-service teacher are transcribed.

The target child or pre-service teacher must be visible on screen to get credit for words, gestures, and/or actions. If it is not clear that the target child or pre-service teacher is communicating directly with one another, the communicative act should not be transcribed.

If there is a lapse of more than 3 seconds between words of either the target child or pre-service teacher, place utterances on separate lines.

If you are unable to understand what someone is saying after listening 3 times, transcribe the utterance as “X”.

If child is not speaking, but demonstrates play action (or functional activity such as eating or drinking), transcribe this action in parentheses when it is imitated by the pre-service
teacher. Then, transcribe the pre-service teacher imitating this action in parentheses and the words she says beside these brackets.

If the pre-service teacher and target child overlap each other when speaking, place < > around each person’s utterances until the communication partners are no longer speaking simultaneously.
Guidelines for Coding

Mirroring and Mapping: type [M &M] beside transcribed adult action

Mirroring and Mapping only occurs for target child and pre-service teacher actions, verbal imitation is not considered mirroring and mapping.

Brackets should be placed beside the adult utterance.

Example: C: {turns page of a book}

T: {turns page of book} turn page. [M&M]

Target child performs play action, pre-service teacher imitates the play action within 3 seconds, and verbally labels the action. The label should be the name of the action or object (i.e. not an “other”).

- Example 2: target child puts a shape in a container, pre-service teacher places shape in a container, and says “in”
- Example 3: target child begins to closes door, pre-service teacher places hand on door to help close door, and says “close door”

Target Talk: type [# for which target was used] beside adult language modeled; if a target was not modeled, leave blank.

Every pre-service teacher’s communicative act should be labeled as a target or non-target. Language modeled is relevant to the moment, not remembering a prior event.

Example for 1-word target:

T: on. [3]

T: a car [1]

T: wow, a car [1]
Non-Example for 1-word target:

T: yes! [NT]

T: thank you! [NT]

1-word Targets:

Noun – mommy, teacher, cat, cup, spoon, etc. [1]

Verb – help, stir, drink, eat, etc. [2]

Protoverb – in, out, on, off, under, over, etc. [3]

1-word Request – more, again, help, want, need, all done, give, etc. [4]

2 word Targets:

Agent + Action – Laura helps, dog runs, block in, he plays, etc. [1]

Action + Agent – go car, push down, open lid, etc. [2]

Modifier + Noun – blue car, two cars, big car, etc. [3]

2-Word Request – help me, go again, my turn, need milk, etc. [4]

3-Word Targets:

Agent + Action + Object: [1]

Mommy sits down, we drive cars, Elmo eats cookies, etc.

Preposition Used in 3-Word Phrases [2]

Put in the bucket, drive under bridge, etc.

Modifier in 3-Word Phrases: [3]

Wear red dress, drive blue car, throw big ball, etc.

3-Word Request Phrases [4]

I need milk, want more cookies, give another block, etc.
4-Word Targets:

3-5 word phrase using a modifier [1]

I want the red ball.

Mommy eats two cookies.

3-5 Word phrase using a preposition [2]

Shape goes in the bucket.

Hat goes on our heads.

4-word Request [3]

He eats more cookies

I want another drink.

Give me the red ball.

Examples of Expansions: The code [E] is used beside the pre-service teacher’s use of any of these expansions. If the target child makes a communicative act and the pre-service teacher does not expand that act, the code [OE] is used.

If the target child’s communicative act is directed towards someone other than the pre-service teacher, that act is not transcribed and the pre-service teacher is not expected to expand that communicative act.

If the target child communicates lower than his/her target level, and the pre-service teacher adds 1-2 words onto that communicative act, this is considered an expansion.

1. Corrective
   Example: Target child labels “home” incorrectly and pre-service corrects by saying “barn”
2. Specifies child language
   Example: Target child says “this” and pre-service teacher specifies with “cow”

3. Adds onto child language
   Example: Target child says “Doggie here” and pre-service teacher responds by saying ‘doggie sits here”
   Example: Target child points to ball, pre-service teacher points to ball and says “ball”
   Example: Target child says “wow!” and pre-service teacher says “wow! go cars!”
   Example: Target child shakes head no and pre-service teacher shakes head no and says “no blocks”.

**Coding Child Targets**

At Target Level: Child uses language at his/her target level.

1. This is 1-word for Jeffrey; 2-word targets for Daniela and 4-word targets for Kendrick. Four-word targets should include an action verb in the prepositional phrase or phrase using a modifier.

2. Examples of request words: want, need, more, help, give, another, all done, or finished.

Not Target Level: Child utterance at correct number of words without using a target. Using past tense or helping verbs rather than action verbs.

Below Target Level: Child’s communicative act is a level below the target. For example, for a 1-word target, saying “oh” is not a target because it is not a noun, verb, protoverb, or request word.
APPENDIX E: CONSENT FORMS

UNIVERSITY OF GEORGIA
CONSENT FORM
Pre-service Teacher Interpretations: The Use of Immediacy Feedback, Bug-in-the-Ear Technology, and Responsive Interaction

Researcher’s Statement
We are asking you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called “informed consent.” A copy of this form will be given to you.

Principal Investigator:  
Dr. Cindy Vail  
Department of Communication Sciences and Special Education  
University of Georgia  
cvail@uga.edu  
(706)542-4578

Purpose of the Study
We are conducting a study to learn more about ways to help UGA students, who are currently participating in a practicum placement, assist young children in developing their language skills. The UGA students will have a UGA graduate student come to their practicum placement and receive feedback on ways they can best help children learn to communicate. UGA students will get these tips when the UGA graduate student calls them while they are wearing a Bluetooth and working with children at the school, and provides suggestions on ways to encourage the children to communicate. We are also interested in learning about how you feel about feedback provided to you while wearing the Bluetooth. We would also like to see if there are any changes in the words a child uses during the course of this study. Children who are enrolled in the classroom and may have delays in their language development will also be asked to participate in this study.

Study Procedures
If you agree to participate, you will be asked to …

- Participate in interviews before and after the study begins. These interviews will be audio recorded and should take for about 20 minutes each. Three additional interviews will also take place during the course of the study that last about 10 minutes each.
- Complete three questionnaires about experiences related to coaching and educational/professional experiences. It is estimated that each should take no longer than 5 minutes to complete.
• Wear a Bluetooth at designated times during your practicum placement and receive live coaching on ways to support young children in their language development. The Bluetooth would be worn in 10-15 minute increments up to three times per week over the course of two months. Additionally, a short training session will take place before each coaching session in which the Bluetooth is worn. These trainings will take place before the live coaching with the Bluetooth. These training sessions are considered part of your time in practicum and will not be considered additional work outside of required hours for your practicum course.
• While wearing the Bluetooth, you will be videotaped to see how communication strategies may be used to help young children learn.

Risks and discomforts
• We do not anticipate any risks or discomforts associated with participating in this study. The decision to participate or not participate in this study will not affect any grades you receive for any courses you take in the Birth – Kindergarten program. Additionally, the decision to participation or not participate in this study will not affect enrollment in the Birth-Kindergarten program.

Benefits
• There are no direct benefits expected by participating in this study.

Incentives for participation
Participants will not receive any type of incentives for participating in this study.

Audio/Video Recording
Audio recording will take place in order to document perspectives about how UGA students feel about coaching and the Bluetooth technology. Video recording will take place to help provide coaching on how UGA students may be using communication strategies to help students learn strategies in working with young children. These videos may also be used in presentations/workshops/trainings.

Please provide initials below if you agree to have this interview audio recorded or not. You may still participate in this study even if you are not willing to have the interview recorded.

_______ I do not want to have this interview audio recorded.
_______ I am willing to have this interview audio recorded.

_______ I do not want to have interactions of me working with young children in my practicum placement video recorded.
_______ I am willing to have interactions of me working with young children in my practicum placement video recorded and used in photographs or shared during presentations/workshops/trainings.

Privacy/Confidentiality
Data collected about you will be coded and any identifiable information about you will not be shared in publications or presentations. This information will be saved onto the desktop computer of the lead researcher for five years. At that time, all information will be destroyed. Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written consent unless required by law.

Taking part is voluntary
Participation in this study is completely voluntary and you can choose to stop without penalty or loss of any benefits to which you may be entitled. We do not anticipate any risks associated with this study. If you don’t want to participate this is fine. If you decide to discontinue participation in this study at any point, you are entitled to do so and this will not have any effect on your grades in any courses or enrollment in the Birth–Kindergarten program. If you decide to withdraw from the study, the information that can be identified as yours will be kept as part of the study and may continue to be analyzed, unless you make a written request to remove, return, or destroy the information.

If you have questions
The main researchers conducting this study are Dr. Cindy Vail, a professor, and Laura McCorkle, a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Dr. Cindy Vail at cvail@uga.edu or at (706)542-4578. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject’s Consent to Participate in Research:
To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_________________________  ________________________  __________
Name of Researcher        Signature                 Date

_________________________  ________________________
Name of Participant        Signature                 Date

Please sign both copies, keep one and return one to the researcher.
Researcher’s Statement
We are asking you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called “informed consent.” A copy of this form will be given to you.

Principal Investigator: Dr. Cindy Vail
Department of Communication Sciences and Special Education
University of Georgia
cvail@uga.edu
(706)542-4578

Purpose of the Study
We are conducting a study to learn more about ways to help UGA students, who are currently participating in a practicum placement in your child’s classroom, assist young children in developing their language skills. The UGA students will have a UGA graduate student come to your child’s classroom and give tips on ways they can best help children learn to communicate. UGA students will get these tips when the UGA graduate student calls them while they are wearing a Bluetooth and working with children at your child’s school, and tells them specific ways they can encourage the children to communicate. We would also like to see if there are any changes in the words a child uses during the course of this study. Children who are enrolled in your child’s classroom and may have delays in their language development will be asked to participate in this study.

Study Procedures
If you agree to participate, you will be asked to …
• Complete a form about how your child communicates and which words your child uses before the study begins and after it ends.
If you agree to allow your child to participate, he/she will be asked to:
• Complete an assessment with the researchers to learn more about how he/she communicates. This assessment involves asking your child to play with a barn/house toy for 6 minutes with a UGA graduate student working on this study.
• Allow researchers to observe him/her interacting with a pre-service teacher who will be receiving live coaching on ways to support young children in their language development via Bluetooth. Each session should last 15 minutes, 3 times per week, over the course of 2 months.

We would also like permission to use photographs and/or videos of your child in presentations/trainings/workshops we may make about this study. Your child’s name will not be used in any of these presentations.

This study will take place at your child’s school for about two months.

Risks and discomfors
t
We do not anticipate that your child will experience any discomfort by being a part of this study. He/she will only be asked to play and communicate with others like he/she typically does at school. The assessment with the barn/farm is play-based and will not place demands on your child.

Benefits
There are no financial benefits or any other known benefits to you and your family by participating in this study.

Incentives for participation
You and your family will not receive any financial benefits or any other type of benefit by agreeing to participate in this study.

Audio/Video Recording
Interactions between the UGA student and your child will be video recorded to see how the UGA student may be using communication strategies that may help support your child in developing his/her language skills. We also videotape the assessment of your child playing with the barn/farm to count how often your child communicates and the ways in which he/she communicates. These videos may also be used in presentations/workshops/trainings to teach others ways to help support the communication development of young children. Videos will be stored on the desktop computer of the lead researcher for five years after this study ends and will then be destroyed.

Please provide initials below if you agree to have this video recorded or not. You may still participate in this study even if you are not willing to have the interview recorded.

I do not want to have this video recorded.
I am willing to have this video recorded.

I do not want to have my child’s photograph or video shared in publications or presentations.
I am willing to have my child’s photograph or video shared in publications or presentations.
Privacy/Confidentiality
Assessment information will be collected by researchers on this study. Codes will be given for each child’s name about information related to their communication development. Only researchers directly working on this study will have access to this information. All information will be stored on the lead researcher’s desktop computer at the University of Georgia for five years. At that time, it will be destroyed.

Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written consent unless required by law.

Taking part is voluntary
Your and your child’s involvement in the study are voluntary, and you and your child may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. If you or your child decide to withdraw from the study, the information that can be identified as yours/his/hers will be kept as part of the study and may continue to be analyzed, unless you make a written request to remove, return, or destroy the information.

If you have questions
The main researchers conducting this study are Dr. Cindy Vail, a professor, and Laura McCorkle, a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Dr. Cindy Vail at cvail@uga.edu or at (706)542-4578. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject’s Consent to Participate in Research:
To voluntarily agree to take part in this study and allow your child to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

Your Child’s Name: _______________________________________

Your Signature: ____________________________________ Date _____

Your Printed Name: _______________________________________

_________________________ ___________________________
<table>
<thead>
<tr>
<th>Name of Researcher</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>

Please sign both copies, keep one and return one to the researcher.
APPENDIX F: IRB APPROVAL LETTER

March 1, 2017

Dear Cynthia Vail:

On 3/1/2017, the IRB reviewed the following submission:

<table>
<thead>
<tr>
<th>Type of Review:</th>
<th>Initial Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of Study:</td>
<td>Pre-service Teacher Interpretations: The Use of Immediacy Feedback, Bug-in-the-Ear Technology, and Responsive Interaction</td>
</tr>
<tr>
<td>Investigator:</td>
<td>Cynthia Vail</td>
</tr>
<tr>
<td>IRB ID:</td>
<td>STUDY0000428D</td>
</tr>
<tr>
<td>Funding:</td>
<td>None</td>
</tr>
<tr>
<td>Documents Reviewed:</td>
<td>Protocol, Recruitment Materials, Consent Forms, Data Collection Materials</td>
</tr>
<tr>
<td>Review Category:</td>
<td>Expedited 6, 7</td>
</tr>
</tbody>
</table>

This study meets the criteria for permissible research with children as set forth at 45 CFR 46.404. One parent or guardian’s signed permission is sufficient to enroll minor subjects.

The IRB approved the protocol from 3/1/2017 to 2/29/2020 inclusive. Before 2/29/2020 or within 30 days of study closure, whichever is earlier, you are to submit a continuing review with required explanations. You can submit a continuing review by navigating to the active study and clicking Create Modification / CR.

If continuing review approval is not granted before the expiration date of 2/29/2020, approval of this study expires on that date.

To document consent, use the consent documents that were approved and stamped by the IRB. Go to the Documents tab to download them.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).
Sincerely,

Dr. Gerald E. Crites, MD, MEd
University of Georgia
Institutional Review Board Chairperson