INCREASING NOVICE TEACHER SUPPORT IN 21ST CENTURY CLASSROOMS: INDUCTION AND MENTORING FOR BEGINNING TEACHERS THROUGH BUG-IN-EAR TECHNOLOGY

by

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ABSTRACT

Novice teachers in today's classroom are in need of support during the initial years of teaching. Providing beginning teachers in special education classroom settings with coaching and immediate feedback through Bug-In-Ear, Bluetooth technology has been identified as a effective strategy for supporting beginning teachers while simultaneously improving generalization and maintenance of instructional strategies in diverse classrooms (Anagnostopoulous, Smith & Basmadjian, 2007; Darling-Hammond and Baratz-Snowden, 2007; Brownell, Ross, Colon & McCallum, 2005). The present study was designed to examine the effects of using BIE, Bluetooth technology with novice teachers in inclusionary settings at a PK-5 charter school. As it has been demonstrated, Bug-In-Ear Bluetooth technology has allowed supervisors and mentors to increase desired teacher behaviors by providing immediate feedback, coaching and prompting during instructional delivery (Scheeler, McAfee, Ruhl and Lee (2006), Scheeler, Ruhl & McAfee, 2004; & Rock, et al., (2009). Specifically, this study looked to increase the average rate per minute of specific feedback statements made to students during reading instruction. Additionally, maintenance of increased rates of specific feedback once BIE coaching and prompting were withdrawn was also of interest. A multiple-baseline design across participants was used. Data were collected during baseline, intervention, and withdrawal phases. The independent variable was identified as prompts delivered by the coach through BIE Bluetooth technology. The dependent variable for this study was the average rate per minute of specific feedback statements made during reading instruction. Overall, the average rate per minute of specific feedback provided to students during reading instruction increased substantially with the use of Bug-In-Ear Bluetooth technology. Further, participants sustained higher than baseline averages of specific feedback provided to students. This study extended Scheeler (2004, 2006),

and Rock's (2009) research on the use of immediate feedback through BIE technology, and demonstrated the effectiveness of this observation method with various participants, groups of students, and classroom diversity.

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CHAPTER ONE: INTRODUCTION

Statement of the Problem

Currently, local school districts and teacher preparation programs are being challenged like never before to enhance induction support for beginning teachers (Billingsley, Carlson & Klein, 2004; Billingsley, Griffin, Smith, Kamman & Isreal, 2009; Boe, Cook & Sunderland, 2008; Kersaint, Lewis, Potter & Meisels, 2007; Neilsen, Barry & Addison, 2007). An increased number of teacher novice teachers, describe feeling unprepared for general education classrooms and even less prepared for diverse learners (Brownell, Hirsch & Seo, 2004; McLeskey, Tyler, & Flippin, 2004). Beginning teachers have also expressed feeling woefully underprepared and receiving little support from administrators, mentors, and supervising teachers when faced with diverse students identified with disabilities (Billingsley, 1993; Billingsley, Carlson & Klein, 2004; Billingsley et al., 2009; Darling-Hammond & Baratz-Snowden, 2007; Ingersoll and Kralik, 2004; Kersaint, Lewis, Potter & Meisels, 2007; NTC, 2006; Smith & Ingersoll, 2004; Wiebke & Bardin, 2009).

Adding to the challenge of supporting new teachers, approximately 2.2 million teachers will need to be hired over the next ten years who are well prepared, and effective in addressing the needs of diverse students (Darling-Hammond & Berry, 2006; Howard, 2007; Ingersoll, 2003; Salinas, Kritsonis, & Herrington, 2006). High rates of turnover contribute significantly to the attrition of beginning teachers in education (Billingsley, Carlson, & Klein, 2004; Darling-Hammond & Brandsford, 2005; McLeskey, Tyler, & Flippin, 2004; Smith & Ingersoll, 2004). In particular, special education teachers leave at 2.5 times the rate of other new teachers (Billingsley, Carlson & Klein, 2004; Billingsley et al., 2009; Boe, Cook & Sunderland, 2008; Darling-Hammond & Baratz-Snowden, 2007; Davis & Higdon, 2008; Liu, 2007; Moir, 2005). In

an effort to combat these increasing rates, a well-planned induction program is a identified effective strategy in addressing the challenge of teacher retention (Billingsley, Griffin, Smith, Kamman & Isreal, 2009; Brownell, Hirsch, & Seo, 2004; McLeskey, Tyler, and Flippin, 2004).

Although induction is not a new concept, teacher preparation programs and local school districts have been charged to identify strategies that enhance induction support for beginning teachers during their initial years teaching in the profession (McLeskey, Tyler & Flippin, 2004; Moir, 2005; Neilsen, Barry & Addison, 2007; Rock, Gregg, Thead, Acker, Gabel & Zigmond 2009; Taylor and Sobel, 2001; Wiebke & Bardin, 2009). In most teacher preparation and induction programs across the nation, supervisory personnel and mentors provide feedback to preservice and beginning teachers on the development of their pedagogy and ability to manage diverse classrooms. They rely upon the use of field notes and anecdotal records which occurs well after the observation (Giebelhaus, 1994; Rock et al, 2009; Scheeler, Macluckie & Albright, 2008; Scheeler, Ruhl & McAfee, 2004). Research has indicated this accepted manner of supervision, mentorship and support is ineffective (Giebelhaus, 1994; Poulos & Mahony, 2007; Price, Martella, Marchand-Martella & Cleanthous, 2002; Rock et al, 2009; Scheeler, McAfee, Ruhl & Lee, 2006). More importantly, Scheeler (2004) reported traditional methods of observing beginning teachers, where feedback was provided after the fact exposed novice teachers' susceptibility to the delivery of instruction that was incorrect and/or inaccurate (Rock et al., 2009; Rock, Gregg, Thead, Acker, Gable & Zigmond, 2009; Scheeler, McAfee, Ruhl & Lee, 2006; Scheeler, Macluckie & Albright, 2008). Consequently, students are subjected to ineffective instructional strategies that are being reinforced by novice teachers until the opportunity to meet and discuss the observation is scheduled. Finally, the impact of deferred feedback often leaves beginning teachers feeling frustrated and isolated and the attrition rates of

special education teachers in particular continues to climb (Billingsley & Mcleskey, 2004; Boe, Cook & Sunderland, 2008; Brownell, 2007; Goodman, Brady, Duffy, Scott & Pollard, 2008; Ingersoll & Smith, 2005; Rock, Gregg, Thead, Acker, Gable & Zigmond 2009; Rosenberg, Boyer, Sindelar & Misra, 2007; Scheeler, Macluckie & Albright, 2008; Scheeler, Ruhl & McAfee, 2004).

The Merger of Technology and Education

Twenty-five years ago, having a computer in your classroom was almost unheard of and the idea of bringing "high-tech" into schools was still cutting edge. Today, things are different. No school seems complete without a full complement of desktop computers (Goolsbee & Guryan, 2002). In 1996, about two-thirds of public schools had Internet access according to data from the National Center for Education Statistics. In fact by 2003, virtually every public school could go online including high-poverty schools (National Center for Education Statistics, 2007a). The amount and variety of technology available to universities continues to grow as well. Today, the potential for new and innovative ways to support beginning teachers during those initial years has increased as technology continues to evolve and integrate into education. The rise of technology in education has led to the development of e- learning, supervision and video conferencing. Finally, online courses, virtual schools, Internet-based professional development, and online assessment programs are all also beginning to take prominent seats in the push for enhancing support for beginning teachers.

Induction

For the past decade, educational leaders and policymakers have conducted research and analyzed results on the impact of induction support programs for beginning teachers. In a report

completed by the National Center to Inform Policy and Practice in Special Education Professional Development (2009), induction was defined as, “The period after preservice teaching extending into the first years in the classroom” (National Center to Inform Policy and Practice in Special Education Professional Development, 2009, pg. 4). Because early teaching experiences in the school and classroom can significantly influence beginning teachers’ feelings of support, induction programs designed to support these new professionals as they transition into their classroom becomes essential. Successful induction programs designed to support beginning teachers as they become acclimated to teaching have also increased the retention rate of novice teachers (Billingsley & Mcleskey, 2004; Darling-Hammond & Sykes, 2003; Guarino, Santibanez & Daley, 2006; Ingersoll & Smith, 2003).

Induction and Mentoring

As beginning teachers transition into their classrooms, a concentrated effort on the part of administrators and experienced teachers who serve as leaders and mentors is critical for successful first-year experiences. Novice teachers look to mentors and administrative leaders who formally and informally provide leadership and mentoring characterized by a commitment in the form of coaching, guidance, assistance, advising, and feedback (Clark, Brooks, Lee, Crawford, & Maxis, 2007). Effective mentoring moves the beginning teachers’ practice forward and successfully challenges their thinking and pedagogy (Bullough Jr., 2008). Normore & Loughry, (2006) found without support and mentorship, beginning teachers reported feeling overwhelmed, disoriented, frustrated, and on their own. Nielsen, Barry, & Addison, (2006) reported a decrease in attrition rates for mentored beginning teachers than for non-mentored teachers. Finally, the frequency of mentor support provided to beginning teachers was found to

impact the effectiveness of mentoring and induction programs for beginning teachers (Billingsley, Griffin, Smith, Kamman & Isreal, 2009). Novice teachers who were provided with either formal or informal meetings scheduled with their assigned mentor from the same background were extremely effective in supporting beginning teachers (Billingsley, Carlson, & Klein, 2004).

Findings over the past decade found beginning teachers face tremendous pressures during the initial years of teaching. However, there still seems to be very little progress in the design and implementation of effective induction programs. Research has continued to report novice teachers struggle with working in hostile school environments and cultures, are unprepared to handle inappropriate student behaviors, lack adequate feedback from mentors and are unfamiliar with effective instructional strategies (Billingsley et al., 2009; Brownell, Hirsch, & Seo, 2004; McLeskey, Tyler, & Flippin, 2004). Despite recent efforts to provide beginning teachers support though induction and mentoring programs, novice teachers continue to leave the profession at an alarming rate (Bullough Jr., 2008). New teachers indicated reasons for leaving the profession after their first year to include: (a) not having a mentor from a similar field of study, (b) lack of common planning times with mentor teachers, and (c) limited opportunity for mentor feedback on field observations of beginning teachers (Scheeler, McAfee, Ruhl, & Lee, 2006).

Rationale

Even with basic teacher preparation from an accredited institution, most novice teachers need continued support during their first years of teaching (Allsopp, DeMarie Alvarez-McHatton & Doone, 2006; Darling-Hammond, 2000; Darling-Hammond & Brandsford, 2005; Darling-Hammond & Berry, 2006; Fuller 2001; Gersten & Brengelman, 1996; Kersaint, Lewis, Potter &

Meisels, 2007; Salhi, 2006; Wiebke & Bardin, 2009). Without strong support for these new teachers, many students in general and special education classes run the risk of being underserved. In addition many novice teachers will leave the profession within the first 5 years of teaching (Alliance for Excellent Education, 2004a; Ingersoll & Kralik, 2004; Wong, 2003a).

Further, during the initial years of entering the profession, new teachers with limited support and delayed feedback from supervisors, mentors and master teachers felt feedback that was provided after the fact resulted in their susceptibility to the delivery of instruction that may be incorrect or inaccurate (Goodman, Brady, Duffy, Scott & Pollard, 2008; Falconer & Lignugaris/Kraft, 2002; Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, Macluckie & Albright, 2008; Scheeler, Ruhl & McAfee, 2004). Since novice teachers lack the background and experience to readily identify effective strategies based on learner characteristics, beginning teachers need increased mentoring, support and immediate feedback on their performance within the classroom during the initial years of teaching.

Purpose of the Study

The purpose of this study was to determine if instructional coaching using Bug-In-Ear Bluetooth technology increased the rate of specific feedback provided to student during reading instruction. Scheeler, Ruhl and McAfee (2004) concluded that effective feedback (i.e., feedback that resulted in behavior change) is (a) systematic, corrective, and positive (Cossairt, Hall, & Hopkins, 1973; Hao, 1991; Sharpe, Lounsbery, & Bahls, 1997), and (b) immediate (Coulter & Grossen, 1997; O'Reilly, Renzaglia, Hutchins, Koterba-Bass, Clayton, Halle & Izen, 1992). Supervision that offers novice teachers immediate feedback has a greater impact on teachers' behavior than traditional feedback provided hours, days, or even weeks after a teacher was

observed (Feiman-Nemser, 2001; Fuller, 2001; Goodman et al., 2008; Kersaint, Lewis, Potter & Meisels, 2007; Moore & Sampson, 2008; Novak, Murray, Scheuermann & Curran, 2009; Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler Macluckie & Albright, 2008; Scheeler, Ruhl & McAfee, 2004). The purpose of this study was to determine if Bug in the Ear can increase novice teachers use of effective practices in their classrooms.

Research Questions

This study examines the effectiveness of Bug-In-Ear, Bluetooth technology as a means to support novice teachers with immediate feedback and prompting. Specifically, the study answered the following questions:

1. Does immediate teacher prompting by an instructional coach with Bug-In-Ear (BIE) Bluetooth technology increase the mean rate of specific feedback given to students, and
2. Given an increase in mean rate, to what extent does the increased average rate of specific feedback sustain during the maintenance phases of BIE?

Operational Definitions

For the purpose of this study, the following definitions are used:

- *Bug-in-Ear*. An inexpensive portable radio communication system (Earpiece and microphone components) used to deliver immediate feedback to teachers delivering classroom instruction (Herold, Ramirez, & Newkirk, 1971; Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, McAfee, Ruhl, & Lee, 2004).
- *Bluetooth.* Bluetooth provides a secure way to connect and exchange information between devices such as faxes, mobile phones, telephones, laptops, personal computers, printers, digital cameras, and video game consoles.

- *Bluetooth adapter*. Provides very short-range wireless transmission, such as between a headset and cell phone or a headset and computer. Bluetooth adapters for laptops and desktops typically plug into a USB port.
- *Charter school*. A charter school is a non-profit, self-managed public school that operates under a performance contract with local school board.
- *Feedback*. Feedback' is a means to direct students in ways to improve by providing information concerning students' ability or inability to understand (Hattie & Timperlay, 2007; Rock, et al., 2009; Scheeler, McAfee, Ruhl, & Lee, 2004).
- *General feedback*. A verbal statement delivered by the teacher that contains feedback, however the feedback does not identify the specific behavior that is being addressed. For example, "Good job Frank!"
- *Immediate feedback*. Feedback delivered within one to three seconds after the desired behavior was or was not observed (Scheeler, Ruhl and McAfee, 2004).
- *Inclusionary classroom*. Providing all students, including those with significant disabilities, equitable opportunities to receive effective educational services, with the needed supplementary aids and support services, in age appropriate classrooms in their neighborhood schools, in order to prepare students for productive lives as full members of society (National Center on Educational Restructuring and Inclusion, 1995, p.99).
- *Induction*. Induction is any program that provides support for a new teacher including mentoring, staff orientation meetings, special meetings, and services that are available only for novice teachers (Kaufman, 2007).
- *Novice teacher*. A teacher who has been in the classroom for less than five complete school years.

- *SKYPE*. Skype is an IP telephony service provider that offers free calling between subscribers. The service is available for desktop computers, notebook and tablet computers and other mobile devices, including mobile phones.
- *Specific feedback*. Specific feedback explicitly identifies for the student the behavior for which she or he is being provided feedback for (Reinke, Lewis-Palmer & Merrell, 2008). For example, “Thank you Jimmy for sitting down at your desk and working quietly on the math project.”
- *Specific learning disability*. A specific learning disability is defined as a disorder in one or more of the basic learning processes involved in understanding or in using language, spoken or written, that may manifest in significant difficulties affecting the ability to listen, speak, read, write, spell, or do mathematics. Associated conditions may include, but are not limited to, dyslexia, dyscalculia, dysgraphia, or developmental aphasia. A specific learning disability does not include learning problems that are primarily the result of a visual, hearing, motor, intellectual, or emotional/behavioral disability, limited English proficiency, or environmental, cultural, or economic factors (Florida Department of Education, 2005).
- *Teacher effectiveness*. For the purpose of this study teacher effectiveness will be defined as the rate per minute of specific feedback provided to students during instructional delivery.
- *Teacher preparation program*. The training, usually in a college of education, intended to provide teachers with the knowledge and skills necessary to be successful in the classroom. Teacher preparation includes alternative certification programs as well as college or university-based programs.

- *Voice Over Internet Program (VOIP).* VoIP is a technology that allows telephone calls to be made over computer networks like the Internet. VoIP supports real-time, two-way transmission of conversations using Internet Protocol (IP).

Significance of the Study

Novice teachers have consistently reported feeling unprepared and lack support during their initial years of teaching. These teachers also reported struggling with students' diverse backgrounds and fail to facilitate effective instructional strategies designed to support students from diverse backgrounds (Billingsley & Mcleskey, 2004; Boe, Cook & Sunderland, 2008; Brownell, 2007; Ingersoll & Smith, 2005; Rosenberg, Boyer, Sindelar & Misra, 2007; Taylor & Sobel, 2001). In order to meet the needs of novice teachers, researchers have suggested that teacher preparation programs and districts develop innovative ways to support beginning teachers in their classrooms (Alliance for Excellent Education, 2004a; Allsopp, DeMarie Alvarez-McHatton & Doone, 2006; Brownell, Hirsch & Seo, 2004; Darling-Hammond, 2006; Darling-Hammond, 2000; Darling-Hammond & Brandsford, 2005; Feiman-Nemser, 2001; Hattie & Timperley, 2007; Latham & Vogt, 2007; McKinney, Haberman, Stafford-Johnson & Robinson, 2008). The potential impact of providing immediate feedback and increased induction support to beginning teachers with Bug-In-Ear, Bluetooth technology can significantly increase the ability of beginning teachers to bridge the gap between theory and practice. During observations of novice teachers as they implement effective instructional strategies, the impact of immediate feedback and support through Bug-In-Ear, Bluetooth technology could significantly increase the amount of support felt by novice teachers while reinforcing the accurate delivery of instructional strategies during reading instruction. Additionally with the integration of

technology into induction programs, the ability to reach more beginning teachers from one location becomes significant in an effort to mentor and support teachers during their early years in a classroom.

Investing in teacher learning has long been identified as an effective strategy to assuring student academic success (Cornett, Ellison, Hayes, Killion, Kise, Knight…& West, 2010). Instructional coaching embedded within the school and classroom is a strategy used to improve research based instructional content delivery (Richardson & Darling-Hammond, 2010. Through the collaboration between teachers and coaches, novice teachers are engaged in job-embedded conversations aimed at improving research-based instructional practices (Knight, 2010, 2009; Cornett & Knight, 2009).

Finally, in a time when schools on all levels are forced to cut costs the significance of this study will address funding challenges faced by school administrators across the nation. With the evolution of technology and the integration of virtual environments and education, no longer are supervising teachers or mentors forced to take significant amounts of time to travel to and from various sites for observations. Instead this study provides a viable option for districts and universities to observe more novice teachers, observe these teachers more frequently and while observing, have the ability to provide immediate feedback during instructional delivery.

Research Design

A multiple baseline design with The Bug-in-Ear (BIE) was conducted across participating teachers in inclusion settings in an effort to draw a single conclusion about intervention effectiveness (Barlow & Hersen, 1984;Parker & Brossart, 2006). This design had 4 phases; Phase 1 baseline (A), Phase 2 intervention (B) and, Phase 3 maintenance (C). A multiple

baseline design shows whether change in behavior accompanies introduction of the intervention at different points of time, capturing the effect of the intervention (Kazdin, 1978). The ABCB design provided the foundation for visual analysis of the effectiveness of the Bug-In-Ear (BIE) intervention. In addition, this replication across participants increased internal validity, experimental control and the demonstration of a functional relationship between the dependent and independent variables identified for this study.

Limitations of the Study

Several factors contribute to the limitations of the study. First, the researcher was only able to conduct research in a local charter school located in the Central Florida area. As a result, the size and the unbalanced number of the participant pool may not have strong generalizability. Second, the participants, for the purpose of the study, were limited to a novice teacher's willingness to participate in the study. Finally, because of various preplanned activities and obligations of the teachers at the study site, the amount of time allotted to collect data was restricted. Consequently, only ninety observations were coded and included in the analysis of data.

Summary

This chapter introduced the myriad of complexities that novice teachers encounter on a daily basis. It has been demonstrated that with technology as a platform, innovative induction can provide beginning teachers with the support to navigate through the complex and ambiguous daily activities encountered by teachers. Although research identified induction as an effective strategy to increase support during the initial years in the classroom, the attrition rate of novice teachers remains high. Thus, there is a need to conduct a research study to connect innovative

induction support for novice teachers aimed at increasing teacher effectiveness and retention during the initial years in the classroom.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

On February 17, 2009, President Barack Obama signed the American Recovery and Reinvestment Act that allocated over 90 billion dollars into the education system in an initiative entitled, "Race to The Top" (U.S. Department of Education, 2009). One program created through this initiative was the Teacher Quality Partnership Grants program. This initiative hopes to prepare approximately 4,000 new teachers for high-need schools in high-needs subject areas (U.S. Department of Education, 2009). With such high stakes, supporting effective teachers who have the ability to motivate and educate diverse students during their initial years is essential (Darling-Hammond & Brandsford, 2005; Darling-Hammond & Berry, 2006; Darling-Hammond, Holtzman, Gatlin & Helig, 2005; Novak, Murray, Scheuermann & Curran, 2009).

Over the past 15 years, the resources devoted to collecting data focused on the assessment of teacher preparation programs have been significant. Organizations such as American Association of Colleges for Teacher Education (AACTE) and the National Council for Accreditation of Teacher Education (NCATE) have collaborated to develop reports such as the Professional Education Data System aimed at gathering data and reporting the effectiveness of teacher education preparation programs. *The MetLife Survey of the American Teacher*, conducted by Harris Interactive (formerly Louis Harris and Associates, Inc.), each year since 1984, explores teacher's opinions on preparation and support. In 2008, the 25th-anniversary MetLife survey reported that 67% of beginning teachers' believed they were prepared to do a good job in the classroom (MetLife, 2008). In 2001, Study of Personnel Needs in Special Education (SPeNSE) completed a report on the characteristics, qualifications, work experiences, and career plans of new special education teachers. The researchers found over 75 percent of beginning teachers

with *5* or fewer years rated the quality of their teacher preparation program as exceptional, good, or very good (Billingsley & McLeskey, 2004; Boe, Cook & Sunderland, 2008; Brownell, 2007; Chud, 2009; Katsiyannis, Zhang & Conroy, 2003; Sobel & Gutierrez, 2009).

Despite reports of novice teachers feeling prepared for the classrooms that they are entering, there are increasing reports of beginning teachers who feel as though they are not ready to face the demands of being a first year teacher. These new teachers consistently reported a need for increased support during the initial years of teaching. As teacher preparation programs continue to develop and enhance current preparation requirements, additional attention should focus on the development of effective induction programs that include collaboration between institutions of higher education (IHE) and local school districts. These induction programs should increase and identify innovative methods for supporting beginning teachers as they transition into their classrooms.

Challenges of Teacher Preparation

"Research on teacher preparation consistently documents the disjuncture between the practices that novice teachers encounter in their preparation courses and those they encounter in the K-12 classrooms in which they learn to teach" (Anagnostopoulos, Smith, & Basmadjian, 2007, p. 138). An overwhelming amount of research highlights challenges faced by teacher preparation programs. One of the challenges is that currently preservice teachers are expected to bridge the gap between theory and practice during student teaching where the implementation of evidence-based instructional strategies learned in university-based courses are applied in the actual classroom (Prater & Sileo, 2004; Holdheide & Reschly, 2008; Kersaint, Lewis, Potter & Meiseis, 2007; Liu, 2007; Moore & Sampson, 2008). Even more troubling, a growing number of

beginning teachers who serve the most diverse and vulnerable students report entering the classroom feeling inadequately trained and are ill prepared for what they must accomplish (Darling-Hammond & Sykes, 2003; Goe, 2006; Little, Goe & Bell, 2009; National Comprehensive Center for teacher Quality, 2009). In 2002, the U.S. Secretary of Education's Annual Report on Teacher Quality stated teacher education preparation programs were directly at fault for not adequately preparing pre-service teachers or collaborating with local school districts to support beginning teachers during the crucial initial years of teaching (Chambers, Lam & Mahitivanichcha, 2008; Darling-Hammond, Wei, Andree, Richardson & Orphanos, 2009).

Generalization of Teaching Behaviors

Scheeler (2008) conducted an extensive review of literature based on the ability of novice teachers to generalize and maintain effective strategies in the classroom across all settings. The researcher reported few empirical studies existed that informed or promoted the generalization of teaching behaviors learned during university coursework and theoretically practiced during the student teaching internship. The researcher also identified three factors that emerged from the literature as key components in helping novice teachers sustain teaching skills learned in the university classrooms during the initial years of teaching. These factors were (1) Using immediate feedback to promote acquisition of skills; (2) Training and support of novice teachers during the initial years to promote maintenance of behaviors and (3) Increased opportunities for interactions with mentors and feedback in the classroom setting (Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, 2008; Scheeler, Macluckie & Albright, 2008; Scheeler, Ruhl & McAfee, 2004; Mastropieri & Scuggs, 2002). In an effort to address the need to bridge the gap

between theory and practice, induction programs designed to provide immediate feedback become essential in the efforts to support and retain beginning teachers.

Instructional Coaching

Over the past decade, there has been a rise in interest on the impact of professional development described as coaching (Cornett, Ellison, Hayes, Killion, Kise, Knight … & West, 2010). An instructional coach has been defined as an onsite professional developer who works with teachers providing on-the-spot, everyday professional development (Knight, 2004; Cornett et al., 2009) Instructional coaches also work with school administrators to implement school improvement initiatives including professional development (Knight, 2010, 2004; Sprick, Garrison & Howard, 1998).

One of the main goals of instructional coaches is to help teachers identify and implement research based instructional strategies in the classroom (Knight, 2010, 2009; Cornett et al., 2010). Coaches also offer support and insight to novice teachers on the management and content delivery in diverse classrooms. Instructional coaches are flexible and meet with various members of the school team in order to identify and develop professional development of teachers based solely on the needs of the individual school (Cornett & Knight, 2008)l. Coaches often meet with departments, and provide one-on-one consultation for novice and interested teachers aimed at identifying and translating research into practice.

Another goal of an instructional coach is to develop relationships with the teachers and administrators they work with on a daily basis (Cornett et al., 2010, Knight, 2010, 2009). Effective coaches have the ability to recognize when a teacher needs support through the relationships they have established from the very beginning. Providing teachers with choices in

decisions regarding instructional strategies for students in their classrooms and offering support and frequent feedback on strategies and instructional delivery are characteristic of a strong coach-teacher relationship (Cornett, Ellison, Hayes, Killion, Kise, Knight … & West, 2010).. Through the emphasis of the personal connections made between the coach and teacher, novice teachers are exposed to a learning community aimed at supporting and nurturing the development of teachers over time (Cornett et al., 2010; Cornett & Knight, 2008; Knight, 2010; Klingner, 2004).

Induction

The teachers hired today are the teachers for the next generation and their success will determine the success of an entire generation of students. Providing them with a comprehensive, coherent induction program can significantly increase their success. Induction is a purposefully designed program to transition a new teacher from "a student of teaching to a teacher of students" (Ingersoll & Kralik, 2004, p. 29). Because induction support has shown to improve teacher quality, the need to continue the education of novice teachers in the first years of teaching through induction support becomes critical (Davis & Higdon, 2008). The National Conference of State Legislatures reported 28 states have laws for new teacher induction programs *("Teacher Induction"* 2008). In addition, the Education Commission of the States reported that 44 states have policies supporting an induction or mentoring program (Kaufmann, 2007a).

Effective induction programs are the ultimate goal for most school districts (Billingsley, Griffin, Smith, Kamman & Israel, 2009; Moir, 2005). In an effort to identify the most effective and essential elements of an induction program, research published over the last two decades

yielded several key elements that districts must include in their planning for support of novice teachers (Billingsley, Griffin, Smith, Kamman & Israel, 2009; Darling-Hammond, 2006; Ingersoll & Kralik, 2004; New Teacher Center, 2006, 2007b). Although historically, literature at times lacked continuity regarding the type of induction resources available to districts and funding to sustain such programs, qualitative analysis produced trends and characteristics of effective induction (Billingsley et al.,, 2009; Brownell, Hirsch, & Seo, 2004; Lopez, Lash, Schaffner, Shields, & Wagner, 2004; McLeskey, Tyler, and Flippin, 2004). Key characteristics of successful induction programs include: (a) providing mentoring and support during initial years of teaching; (b) matching novice teachers and mentors based on personality, grade level, and subject area; (c) addressing issues that beginning teachers face including classroom management; teaching practices; workload and time management; (d) providing beginning teachers with reduced workloads; (e) increased frequency of support received by beginning teachers and (f) the inclusion of various forms of assessment of novice teachers (Billingsley et al., 2009; Ingersoll & Kralik, 2004; Smith & Ingersoll, 2004).

As one of the leaders in the development, research and assessment of induction programs, the New Teacher Center (NTC) located in Santa Cruz, California, identified several elements of high-quality induction programs for new teachers. NTC identified the following as a few of the key components for a quality induction program: (a) full-time program administrators, (b) quality mentoring, (c) specific selection criteria for mentors, and (d) training for work with diverse students and English language learners (Billingsley et al., 2009; Feiman-Nemser, 2001; Moir, 2005). More recently, Moir, (2005) and the, NTC, (2006, 2007b) identified key components of effective induction programs that included: (a) identification of novice educators who will participate in induction programs, (b) mentor selection, characteristics and training and

assigning mentors with new teachers, (c) induction program delivery and activities, (d) evaluation and accountability of the induction program and (e) access to resources (The National Council to Inform Policy and Practice in Special Education Personnel Preparation (NCIPP), 2006; The Center on Personnel Studies in Special Education (COPSSE), 2007; Billingsley, Griffin, Smith, Kamman, & Israel, 2009) .

Current State of Induction

In practice, teacher induction is common, but induction that is intensive, comprehensive, structured, and sequentially delivered in response to teachers' emerging pedagogical skills and knowledge is not (Darling-Hammond & AACTE, 1999; Moir, 2005; Smith & Ingersoll, 2004). In many other professions, a true induction period is not only expected but is required (Darling-Hammond, 2006). Physicians participate in internships and residencies. Lawyers often serve as legal clerks or legal researchers. In education, beginning and novice teachers are expected to assume the same roles and responsibilities as an experienced teacher on the very first day of employment and on the job training is limited to student teaching practicum (Feiman-Nemser, 2001; Feiman-Nemser & Parker, 1993; Wong & Wong, 1998). As the need for teachers continues to increase, the need to hold on to talented new teachers becomes even more critical (Alliance for Excellent Education, 2004; Hall, Draper, Smith & Bullough, 2008; Danielson, 2002; National Center for Education Statistics (NCES), 2007; Neilson, Barry & Addison, 2007; Wang & Odell, 2002). In a study of national survey data, Smith and Ingersoll (2003) found that comprehensive induction programs had a positive effect on new teacher retention.

In direct contrast almost eighty percent of beginning and novice teachers who received extensive induction experiences, remained in the field (Anderson & Shannon, 1988; Alliance for

Excellent Education, 2004; Billingsley, Carlson & Klein, 2004; Boe, Cook & Sunderland, 2008; Danielson, 2002; Darling-Hammond, Wei, Andree, Richardson & Orphanos, 2009; Ingersoll & Kralik, 2004; Latham & Vogt, 2007; McKinney, Haberman, Stafford-Johnson & Robinson, 2008; Odell & Ferraro, 1992; Wong, 2003). Two induction program variables identified by Smith and Ingersoll (2004) as having had the most impact on teacher retention were collaborative planning time and mentors who share the same field of teaching as the mentee (Billingsley, Griffin, Smith, Kamman & Israel, 2009; Darling-Hammond, Wei, Andree, Richardson & Orphanos, 2009; Feiman-Nemser, 2001; Moir, 2005; Nielsen, Barry, & Addison, 2006). As efforts to increase beginning teacher retention gain momentum, national and international investigations have reported increased retention rates with teachers who participate in induction programs during the initial years of teaching (Billingsley, 2004b; Darling-Hammond, 2006; Neilson, Barry & Addison, 2007; Wiebke & Bardin, 2009).

The Role of Mentoring in Induction

Mentoring is only one component of a comprehensive induction program. Odell and Ferraro (1992) contended that the goals of mentoring are to provide support, to promote professional development, and to increase retention. Mentoring helps the beginning teacher with the daily challenges of teaching (Billingsley, Carlson & Klein, 2004; Danielson, 2002; Neilson, Barry & Addison, 2007; Wiebke & Bardin, 2009). As beginning teachers transition into their classrooms, successful first-year experiences require a concentrated effort on the part of administrators and experienced faculty members who serve as leaders and mentors (Billingsley, Carlson & Klein, 2004; Darling-Hammond, 2000; Darling-Hammond & Berry, 2006; Davis & Higdon, 2008; Guarino, Santibanaez & Daley, 2006; Haberman, 2005; Moir, 2005; Smith &

Ingersoll, 2004; Wang & Odell, 2002). Mentoring has been defined as, "A nurturing process in which a skilled or more experienced person, serving as a role model, teaches, sponsors, encourages, counsels a less skilled or less experienced person for the purpose of promoting the latter's professional and/or personal development" (Anderson & Shannon, 1988, p. 40). Nielsen, Barry, & Addison, (2006) found a higher retention rate for mentored beginning teachers. According to Study of Personnel Needs in Special Education (*SPeNSE*, 2002), 72% of special educators new to the profession found mentoring programs helpful. Typically, beginning teachers look to effective mentors who formally and informally provide leadership and mentoring characterized by a substantial emotional commitment in the form of coaching, guidance and feedback (Billingsley, Carlson & Klein, 2004; Davis & Higdon, 2008; Nielsen, Barry, & Addison, 2006). Further, Normore & Loughry, (2006) found without mentor support and feedback, beginning teachers felt overwhelmed, frustrated and struggled to identify effective strategies aimed at working with diverse students identified with disabilities (Danielson 2002; Halford 1998; Nolan & Hoover 2004).

Effective Mentoring Programs

Mentoring has the potential as a model for professional development to improve practice in schools (Feiman-Nemser &Parker, 1993; Griffin, Winn, Otis-Wilborn, & Kilgore, 2002; Odell & Huling, 2000; Smith & Ingersoll, 2004; Wang & Odell, 2001; Whitaker, 2000). In order to help retain good beginning and novice teachers, teacher-mentoring programs should be developed. Mentoring programs serve as a support system to help beginning teachers with their multiple duties and responsibilities (Anderson & Shannon, 1988; Alliance for Excellent Education, 2004; Billingsley, Carlson & Klein, 2004; Darling-Hammond & Berry, 2006;

Feiman-Nemser, 2001; Feiman-Nemser & Parker, 1993; Haberman, 2005; Moir, 2005; Smith & Ingersoll, 2004).

Griffin, Winn, Otis-Wilborn, and Kilgore (2002) identified six common elements of mentoring programs associated with successful first year teaching experiences. These core components are: (1) a culture of shared responsibility and support; (2) interactions between new and experienced teachers, (3) continuum of professional development, (4) de-emphasized evaluation, (5) clear goals and purposes, and (6) diversified content. In general, beginning teachers had positive experiences with mentor programs that incorporated these six components, including an increase in self-confidence, and ability to develop and facilitate effective instructional strategies for diverse students identified with disabilities (Billingsley, Carlson & Klein, 2004; Davis & Higdon, 2008; Haberman, 2005; Moir, 2005; Smith & Ingersoll, 2004).

Goals for mentoring programs vary across locales, but typically include (a) retaining new teachers, (b) easing the transition into the profession, and (c) instructional improvement (Griffin, Winn, Otis-Wilborn & Kilgore, 2002; Heller, 2004; Liu, 2007; Odell & Ferraro, 1992; Odell Huling, 2000; Wiebke & Bardin, 2009). Additional goals may include transmitting the culture of the profession or school and promoting the overall well-being of novice teachers (Darling-Hammond & Baratz-Snow, 2007; Darling-Hammond & Bransford, 2005; Howard, 2007; Mills, Moore, & Keane, 2001). Like Florida, most states mandate induction programs for beginning teachers that provide beginning teachers with induction and mentoring support. These services however, do not always include feedback on teaching, a formal evaluation process, or targeted training.

Mentor Feedback

Traditionally, mentors provide feedback on teaching practice in three identified stages: pre-observation conferencing; observation; and post-observation conferencing (Allsopp, DeMarie, Alvarez-McHatton & Doone, 2006; Buck, Morsink, Griffin, Hines & Lenk, 1992; Hattie & Timperley, 2007; Knowlton, 2004; Rock, Gregg, Thead, Acker, Gable & Zigmond, 2009; Rock, Gregg, Howard, Ploessl, Maughn & Gable, 2009; Scheeler & Lee, 2002; Scheeler, Ruhl & McAfee, 2004). This method provides feedback by master teachers to beginning teachers in a deferred manner where the observer attempts to remain unobtrusive and silent while taking notes in an effort to avoid interruption of instructional flow in the classroom (Scheeler, McAfee, Ruhl & Lee, 2006; Scheeler & Lee, 2002; West & Jones, 2007). One shortcoming of this method pertains to providing feedback after the fact, which results in new teachers' susceptibility to providing instruction that may be incorrect and inaccurate (Colvin, Flannery, Sugai & Monegan, 2009; Scheeler & Lee, 2002; Scheeler, Ruhl & McAfee, 2004; Scheeler, McAfee, Ruhl & Lee, 2006). Unfortunately, most beginning teachers do not believe they are provided with consistent, immediate feedback regarding their teaching pedagogy and the implementation of effective instructional strategies (Scheeler, Ruhl, and McAfee, 2004).

Despite recent efforts to provide new teachers support though induction and mentoring programs, novice teachers continue to leave the profession at an alarming rate (Alliance for Excellent Education, 2004a; Billingsley, 1993; Boe, Cook & Sunderland, 2008; Haberman, 2005; Ingersoll & Kralik, 2004; Kersaint, Lewis, Potter & Meisels, 2007; Smith & Ingersoll, 2004). New teachers indicated reasons for leaving the profession after their first year to include: (a) not having a mentor from a similar field of study, (b) lack of common planning times with mentor teachers, and (c) limited opportunity for mentor feedback on field observations of

beginning teachers (Alliance for Excellent Education, 2004a; Billingsley, 1993; Boe, Cook & Sunderland, 2008; Haberman, 2005; Kersaint, Lewis, Potter & Meisels, 2007; Smith & Ingersoll, 2004). In contrast to providing deferred feedback to beginning teachers, the ability of mentors to observe beginning teachers and provide immediate feedback provides new teachers with instant, in-flight coaching where teacher behaviors can be corrected immediately with coaching provided through the use of Bug-In-Ear (BIE) technology (Colvin, Flannery, Sugai & Monegan, 2009; Coulter & Grossen, 1997; Giebelhaus, 1994; Goodman, Brady, Duffy, Scott & Pollard, 2008; Rock, Gregg, Thead, Acker, Gable & Zigmond, 2009; Rock, Gregg, Howard, Ploessl, Maughn & Gable, 2009; Scheeler & Lee, 2002; Scheeler, Ruhl & McAfee, 2004; Scheeler, McAfee, Ruhl & Lee, 2006 . BIE technology is a tested strategy used in a variety of educational settings to provide immediate feedback in a discreet manner to beginning teachers during their first year (Colvin, Flannery, Sugai & Monegan, 2009; Coulter & Grossen, 1997; Giebelhaus, 1994; Goodman, Brady, Duffy, Scott & Pollard, 2008; Rock et al., 2009; Rock et al., 2009; Scheeler, McAfee, Ruhl & Lee, 2006). Further, new teachers who received immediate, consistent and formative feedback from mentors felt supported and managed their classroom more effectively (Rock et al., 2009; Rock et al., 2009; Scheeler, Ruhl & McAfee, 2004; Scheeler, McAfee, Ruhl & Lee, 2006). For the purpose of this study, the term "mentoring" will mean the use of strategies that are isolated from any other type of induction support or service.

Induction, Mentoring and Technology

Over the last fifteen years, American schools have dramatically increased spending on classroom technology to more than $5 billion annually (Doering, Johnson & Dexter, 2003; Franklin, Sexton & Lu, 2007; Goolsbee & Guryan, 2002; Johnson, Levine, Smith & Smythe,

2009; West & Jones, 2007). With the Internet becoming the world's largest database of information, graphics, and streaming video the integration of technology has become an invaluable resource for the preparation and support of teachers entering diverse classrooms (Cuban, Larry, Kirkpatrick, Heather, & Peck, 2001; Rock, Gregg, Howard, Ploessl, Maughn & Gable, 2009). In order to meet the demands of a diverse student population in our K-12 classrooms, teacher preparation and induction programs will require a systemic change from their traditional teacher preparation and induction models (Darling-Hammond, 2006; Darling-Hammond, Chung, & Frelow, 2002; Connelly & Graham, 2009). Technology may be a viable platform used to increase the support of novice teachers (Doering, Johnson, & Dexter, 2003; Franklin, Sexton & Lu, 2007; Rock et al., 2009; Scheeler, Ruhl & McAfee, 2004; Scheeler, McAfee, Ruhl & Lee, 2006). With the evolution of technology, the integration of webcams, online videoconferencing and email facilitate supervision, reflection, and/or communication between novice teachers, university faculty and cooperating teachers. Additionally, numerous studies have examined such uses of technology in conjunction with field-based experiences (Doering, Johnson, & Dexter, 2003; Gruenhagen, McCracken, & True, 1999; Holstrom, Ruiz, & Weller, 2007; Johnson, Maring, Doty, & Fickle, 2006; Knowlton, 2004; Liu, 2005; Mason, 2000). Santagata et al. (2007) found that the use of virtual-video-based field experiences helped novice teachers move from simple descriptions of classroom actions to focused observations about student learning and teacher interaction, and subsequently applied these skills in authentic settings. Technological advances and new approaches to teaching and learning have opened up new possibilities for teacher preparation programs where more frequent and consistent communication and feedback can be provided to novice teachers in a variety of classrooms and

stages of teaching (Scheeler, Ruhl & McAfee, 2004; Scheeler, McAfee, Ruhl & Lee, 2006; Sobel & Guiterrez, 2009).

Impact of Bug-In-Ear Technology

One solution to providing novice teachers with support during the initial years of teaching and allow for immediate feedback and reflection on content delivery has been recognized with the evolution of Bug-In-Ear (BIE) Bluetooth technology (Falconer & Lignugaris/Kraft, 2002; Goodman, Brady, Duffy, Scott & Pollard, 2008; Johnson, Levine, Smith & Smythe, 2009; Korner & Brown, 1952; Rock, Gregg, Thead, Acker, Gable & Zigmond, 2009; Rock, Gregg, Howard, Ploessl, Maughn & Gable, 2009; West & Jones, 2007). BIE technology provides immediate feedback in real-time to beginning teachers as they translate research into classroom practice and has been used in a variety of educational settings (Rock et al., 2009; Rock et al., 2009; Scheeler, Ruhl & McAfee, 2004; Scheeler, McAfee, Ruhl & Lee, 2006). In a discreet manner, mentors and supervising teachers observed novice teachers in action and with BIE provided immediate feedback to beginning practitioners during instructional delivery (Coulter & Grossen, 1997; Giebelhaus, 1994; Rock et al., 2009). Korner and Brown (1952) initially introduced BIE as a means to prepare clinical psychologists during practicum and their initial years of practice in an unobtrusive manner. BIE has since been utilized in several professions including law enforcement, psychology and counseling (Rock et al., 2009; Rock et al., 2009; Scheeler, Ruhl & McAfee, 2004; Scheeler, McAfee, Ruhl & Lee, 2006). Initially, BIE technology was comprised of large and cumbersome audio systems that were often intrusive to the immediate environment (Coulter & Grossen, 1997; Giebelhaus, 1994). Today, BIE is comprised of two major components: a Bluetooth earpiece, and a USB adaptor. Recently,

interactive videoconferencing such as SKYPE in conjunction with BIE technology aids in the assessment of beginning teachers as they teach in their classrooms (Franklin, Sexton, Lu, & Ma, 2007; Rock, Gregg, Howard, Ploessl, Maughn & Gable, 2009; Rock, Gregg, Thead, Acker, Gable & Zigmond, 2009; Scheeler, McAfee, Ruhl & Lee, 2006). Herold, Ramirez, & Newkirk (1971) found BIE technology to be superior to the traditional form of supervision that relied on deferred and delayed feedback provided during the post observation conference. Recent studies in numerous educational environments including elementary classrooms, special education classrooms, and physical education classrooms demonstrated increased facilitation of evidence-based instructional strategies with immediate feedback provided to novice teachers (Franklin, Sexton, Lu, & Ma, 2007; Rock, Gregg, Howard, Ploessl, Maughn & Gable, 2009; Rock, Gregg, Thead, Acker, Gable & Zigmond, 2009; Scheeler, McAfee, Ruhl & Lee, 2006). Through use of BIE technology, new teachers reported their student experiences to be formative, supportive and creative with the integration of BIE as a strategy for providing beginning teachers immediate feedback. (Giebelhaus, 1994; Scheeler, 2008; Scheeler, McAfee, Ruhl & Lee, 2006). Giebelhaus (1994) conducted a study and found that a supervisor's use of short and specific feedback statements delivered via Bug-In Ear technology prevented disruptions in the flow of instruction. This study conducted at a large mid-western university investigated the use of Bug-In-Ear technology with 22 elementary education student teachers and their cooperating teachers. The study involved student teachers placed in three urban school districts and 17 suburban schools over a nine-week period. Treatment groups were student teachers in their last practicum requirement with one group receiving audio-cuing or prompting via Bug-In-Ear from their cooperating teachers and the control group receiving feedback in the traditional delayed manner (Giebelhaus, 1994). The dependent variables were 14 discrete teacher clarity behaviors that were

identifiable, measurable, and observable. The findings of this research supported the research that some student teachers while receiving prompts via Bug-In-Ear technology can change ineffective teaching behaviors during the teaching process.

Using this technology, novice teachers receive real-time feedback during field experiences. In contrast to deferred feedback, the ability of supervising teachers to observe and provide immediate feedback provides the opportunity to immediately correct undesirable teacher behaviors (Colvin, Flannery, Sugai & Monegan, 2009; Coulter & Grossen, 1997; Franklin, Sexton, Lu, & Ma, 2007). Beginning teachers who received immediate, consistent, and formative feedback from supervising teachers indicated a feeling of support and ability to manage their classroom more effectively (Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, 2008; Scheeler & Lee, 2002; Scheeler, McAfee, Ruhl & Lee, 2006; Scheeler, Ruhl & McAfee, 2004).

Feedback

The ability to provide novice teachers with immediate, precise, and frequent feedback from qualified mentors, supervising teachers, and university support personnel with minimal interruption of student learning is essential (Billingsley & McLeskey, 2004; Colvin, Flannery, Sugai, & Monegan, 2009; Rathel, Drasgow & Christle, 2008). Teacher preparation and induction models that incorporate mentor support and immediate feedback during the initial years in a classroom are essential (Buck, Morsink, Griffin, Hines & Lenk, 1992; Colvin et al., 2008; Darling-Hammond, 2002). Greenwood and Maheady (1997) found beginning teachers' instructional practices were improved through the use of effective supervision strategies that

included consistent, specific, and corrective feedback (Coulter & Grossen, 1997; Malott & Suarez, 2004; Scheeler & Lee, 2002; Scheeler, Ruhl, & McAfee, 2004).

Traditionally, novice teachers received feedback on teaching practice in three identified stages: pre-observation conferencing; observation; and post-observation conferencing (Wiedmer, 1995). This method provided feedback by master teachers to beginning teachers in a deferred manner where the observer attempted to remain unobtrusive and silent while taking notes and avoiding interruption of instructional flow (Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler, Macluckie & Albright, 2008; Scheeler, Ruhl & McAfee, 2004). With advances in technology, opportunities for more immediate feedback and coaching are now possible that do not interrupt the flow of instruction and offer immediate assistance to beginning teachers as they teach.

Immediate Feedback

Scheeler &Lee, (2002) conducted a study examining the effects of immediate corrective feedback on one specific teaching behavior of three novice teachers completing their special education practicum experience at a large eastern university. This multiple baseline across participants research design evaluated the effectiveness of immediate and corrective feedback delivered via a wireless FM listening system (Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler, Macluckie & Albright, 2008). Researchers found that immediate corrective feedback compared to delayed feedback increased desired teacher behaviors. Through a three-term contingency frame, using (a) antecedent by the teacher, (b) response by the student, and (c) consequence delivered by the teacher, the researchers were able to introduce the intervention and see an increase in the desired three-term contingency trials delivered to students across all participants

(Colvin, Flannery, Sugai & Monegan, 2009; Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler, Macluckie & Albright, 2008). Immediate feedback was more effective than traditional delayed feedback procedures in an effort to increase the number of trials preformed by novice teachers in special education classrooms.

Finally, Scheeler, Ruhl & McAfee (2004), examined the effects of immediate feedback with Bug-In-Ear (BIE) technology to increase specific teaching behaviors, monitor relationships between teacher and student behavior and acceptability of the integration of technology as a means for providing feedback to novice teachers. This study used a multiple baseline design to examine effects of immediate, corrective feedback delivered via wireless technology. Five novice special education teachers participated in elementary and middle school classrooms participated. Results demonstrated corrective and immediate feedback increased specific teacher behaviors. During baseline, the percentage of completion ranged from 30-92. With corrective, immediate feedback, all five teachers reached criterion level of 90% completion. Further, Scheeler, et al., (2004) were able to identify a novice teacher's repeated errors that may have led students to perform skills incorrectly and consequently, reinforce the wrong student behaviors (Colvin, Flannery, Sugai & Monegan, 2009; Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler, Macluckie & Albright, 2008).

Performance Feedback

In general, the ability to provide novice teachers with performance feedback increased desired teacher specific behaviors (Colvin, Flannery, Sugai & Monegan, 2009; Goodman, Brady, Duffy, Scott & Pollard, 2008; Moore & Sampson, 2008; Sutherland, 2000). Performance feedback can be defined as providing feedback or knowledge of processes and results to promote

transfer or maintenance of skills and behaviors (Auld, Belfiore & Scheeler, 2007; Mortensen & Witt, 1998; Scheeler & Lee, 2002). The effects of performance feedback have been well documented as well. In a study of three student teachers who received daily performance feedback from experienced teachers, Keller et al., (2005), found increased rates of specific feedback for students identified with developmental disabilities. This study investigated effects of an audiotape self-evaluation intervention on the instructional behavior of three novice student teachers in classrooms for students with various developmental disabilities. A multiple baseline design evaluated the intervention. Results indicated a positive effect on all participants' use of specific social feedback provided to students. Additionally, generalization probes indicated two of three novice teachers increased their use of specific social feedback in non-targeted content areas. Finally, maintenance probes also indicated all novice teachers' average use of specific social feedback was well above baseline.

In 2004, Scheeler, Ruhl & McAfee completed an extensive review of literature on the effectiveness of performance feedback provided to novice teachers. After reviewing and analyzing ten empirical studies, the impact of various attributes of feedback given to novice teachers clustered in the following categories: (a) nature of feedback, (b) temporal dimensions of feedback, and (c) who delivered the feedback (Colvin, Flannery, Sugai & Monegan, 2009; Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler, Macluckie & Albright, 2008). In general, the review identified immediate feedback as an effective means for providing performance feedback to novice teachers. Results also indicated the only attribute that clearly demonstrated a positive impact was immediate feedback provided to novice teachers versus delayed feedback given at post observation conferences (Colvin, Flannery, Sugai & Monegan, 2009; Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009;

Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler, Ruhl & McAfee, 2004). In direct contrast to immediate feedback, deferred feedback significantly increased the potential of new teachers to deliver instructional strategies that may be incorrect or inaccurate (Price, Martella, Marchand-Martella & Cleanthous, 2002; Rock, Gregg, Thead, Acker, Gabel & Zigmond, 2009; Scheeler, Ruhl & McAfee, 2004).

Codding, Feinberg, Dunn & Pace (2005) completed a study on implementing antecedent and consequence procedures in an ongoing behavior support plan. A multiple baseline design for two classrooms evaluated the effects of performance feedback on the percentage of antecedent and consequence components implemented correctly during 1-hr observation sessions. Performance feedback was provided every other week for 8 to 22 weeks after a stable or decreasing trend in the percentage of antecedent or consequence components were implemented correctly. Results from the study suggested that performance feedback increased antecedent components for 4 of 5 teachers and consequence components for all 5 teachers.

Research suggested performance feedback provided to novice teachers has been shown to increase the frequency of specific feedback given to students (Rathel, Drasgow & Christle, 2008; Reinke, Lewis, & Merrell, 2008; Scheeler, Ruhl & McAfee, 2004; Sutherland, 2000). Reinke et al, (2008) conducted a study that evaluated the effects of the Classroom Check-Up and visual performance feedback on teacher and student behaviors. The results indicated increased implementation of classroom management strategies that included the use of general and specific feedback with visual performance feedback. This study included four general education elementary teachers who were selected to participate based on their request for support with classroom management. A single subject, multiple baselines across classrooms research design was used to determine the relationship between the independent variable of visual performance

feedback and the dependent variable of teacher and student behavior. Despite only providing visual performance feedback on the teachers' overall use of specific feedback in general, results indicated an increase in use of specific feedback across all participants (Codding, Feinberg, Dunn & Pace, 2005; Reinke, Lewis, & Merrell, 2008). Finally, Sutherland, (2000) found performance feedback given to pre-service teachers before and after observation sessions 3 times a week increased the frequency of behavior-specific feedback and student on-task behavior.

Behavior-Specific Feedback

Research has consistently demonstrated a functional relationship between a teacher's behavior-specific feedback and student engagement (Sutherland & Wehby, 2001; Sutherland, Alder & Gunter, 2003; Sutherland, Wehby & Copeland, 2000; Sutherland, Wehby & Yoder, 2002). In behavior-specific feedback, a feedback statement reinforces the desired behavior (Kalis, Vannest, & Parker, 2007). Kirby and Shields (1972) researched the effect of contingent-specific feedback on the number of correct math problems completed by 7th grade students who exhibited off-task behaviors in the classroom. The researchers found that students with high incidents of off-task behavior increased their on-task behaviors from 51% during baseline to 97% during the first intervention phase, and decreasing to 82% during maintenance and fading intervals when provided contingent specific feedback from the teacher during academic instruction (Sutherland, 2000; Sutherland & Wehby, 2001; Sutherland, Alder & Gunter, 2003; Sutherland, Wehby & Copeland, 2000). Sutherland, Wehby, and Yoder (2002), completed a study in 20 self-contained classroom grades K-8 for students with emotional disturbances (ED) where students were typically referred for behaviors and learning problems. Two hundred sixteen students volunteered to participate with twenty teachers from a large city located in the

southeastern United States. The researchers measured the relationship between teacher feedback and student opportunity to respond (OTR) using Pearson's r. Results indicated that teachers who have high rates of specific feedback have high rates of OTR and in turn have increased student engagement in the classroom (Chalk & Bizo, 2004; Sugai & Horner; 2005; Sutherland, Wehby & Copeland, 2000; Sutherland, Alder & Gunter, 2003). Finally, Sutherland, Wheby, and Copeland (2000) conducted research in a 5th grade special education classroom on the effectiveness of behavior-specific feedback. Results indicated teachers trained to provide students identified as emotional and behavioral disorder (EBD) with behavior-specific feedback and praise during academic instruction increased desired student behavior and engagement (Sutherland, Alder & Gunter, 2003; Sutherland, Wehby, & Yoder, 2002). The researchers specifically looked at the effect of feedback and the rate of the teacher's behavior-specific feedback provided to students with EBD. Increased behavior-specific feedback provided to students has been associated with increased student engagement in particular students with high incidence disabilities. Gunter, Jack, Shores, Carrell, and Flowers (1993) found in a study that teacher feedback provided every three minutes to students with EBD increased student engagement. In 2000, Sutherland, Wehby, and Copeland conducted a study and witnessed an increase of student engagement from 56% to 85 % when the teacher's behavior-specific feedback increased. In 1983, Gable, Hendrickson, Young, Shores, and Stowitschek used direct observation of teacher behaviors in 14 classrooms for students with EBD and found rates of behavior-specific feedback ranged from 1.6 per hour to 2.8 per hour (Sutherland, Alder & Gunter, 2003; Sutherland, Wehby, & Copeland, 2000; Sutherland, Wehby, & Yoder, 2002). Although behavior-specific feedback has been shown to increase student engagement, teachers in general and in special education classrooms rarely use this strategy as a means to increase student performance and on-task behavior (Rathel, Drasgow

& Christle, 2008; Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler, Ruhl & McAfee, 2004; Sutherland, Alder & Gunter, 2003; Sutherland, Wehby, & Copeland, 2000).

Summary

This review of the literature described an overview of the need for enhanced and innovative induction support for beginning teachers. Next, identifying components of effective induction, offers insight to districts and institutions of higher education that will identify the key elements of innovative induction programs that can increase the support provided to beginning teachers during the initial years in the classroom. Finally, there was a discussion of the concept of using technology and immediate feedback to increase teacher support. A review of the topics suggests that although there has been research involving the support for novice teachers there is limited research regarding the link between immediate feedback through technology and the ability to increase specific teacher behaviors identified as effective in the classroom. Thus, there is a need to investigate the potential effect of providing immediate feedback to beginning teachers through bug-in-ear support to improve the instructional delivery and teacher feedback to students.

CHAPTER THREE: METHODOLOGY

The purpose of this study was to determine if instructional coaching using Bug-In-Ear Bluetooth technology increased the rate of specific feedback provided to student during reading instruction. This chapter describes the research design, setting and participants, variables, instrumentation, reliability, data collection procedures, and data analysis. Additionally, observation schedules, implementation and protocol for equipment use and technology requirements are discussed.

Review of Research Questions

This study examined the effectiveness of supporting novice teachers through Bug-In-Ear (BIE) technology. Specifically, the study looked to answer the following questions:

1. Does immediate teacher prompting by an instructional coach with Bug-In-Ear (BIE) Bluetooth technology increase the mean rate of specific feedback given to students, and
2. Given an increase in mean rate, to what extent does the increased average rate of specific feedback sustain during the maintenance phases of BIE?

Research Design

In an effort to determine the effectiveness of the intervention across subjects, the researcher used a multiple baseline design across participants (Barlow & Hersen, 1984). This design had 4 phases; Phase 1 baseline (A), Phase 2 intervention (B) and, Phase 3 maintenance (C). Single subject design allows the opportunity to see a change or no change in behavior within an individual, as opposed to looking at a group as a whole (Foster, Watson, & Young, 2002; Kazdin, 1982). The small sample size was justified in that single subject design allowed for personalized and individual analysis of results (Barlow & Hersen, 1984; Kazdin, 1982). A

multiple baseline design shows whether change in behavior accompanies introduction of the intervention at different points over time, capturing the effect of the intervention (Kazdin, 1978). The ABCB design provided the foundation for visual analysis of the effectiveness of the Bug-In-Ear (BIE) intervention. Additionally, this design potentially demonstrated a significant decrease in the desired rate of specific feedback when BIE was withdrawn from the participant (Barlow & Hersen, 1984; Kazdin, 1982). The design was across participating teachers in inclusion settings in an effort to draw a single conclusion about intervention effectiveness (Parker & Brossart, 2006). Replication across participants allowed increased internal validity, experimental control and demonstration of a functional relationship between the dependent and independent variables (Horner, Carr, Halle, Mcgee, Odem, & Wolery, 2005; Kazdin, 1982).

Setting

The study took place at a local urban elementary charter school located in Central Florida during reading instruction. Observations were conducted during daily reading blocks lasting 90 minutes. This charter school operated independently of the local school district and was a school of choice. Schools of choice are open to all students residing within the district however, are allowed to target students within specific age groups or grade levels, and an option for parents who feel as though their original public school placement does not meet the needs of their child. At the time of the study, the school served children located in the immediate community, which included a 1.3-mile radius in downtown Orlando, Florida. Ninety nine percent of the students were African-American and 96 % of students received free and reduced lunch.

Technology on site was minimal at the beginning of the school year. Computers located in classrooms were over 4 years old operating on outdated windows software systems. Teachers

worked on dell desktop computers that needed upgrades for all software including Internet Explorer. Initially the computer lab was located in the main office. Of the 24 computers set-up only 8 worked. Prior to the beginning of the study, a new computer lab with State-of the Art technology was donated to the school with new software for all computers. All classrooms received five new dell desktop computers for students to use and all teachers received a new desktop as well with Internet and updated operating system software.

Description of Participants

Table 1 contains the teacher preparation training and the number of years experience teaching in both general and special education classroom settings. All participants in the study were certified in the State of Florida in elementary education. All participants were female. Two teachers taught kindergarten and one first grade at the charter school. Two of the teachers had received training in special education or had been teaching for longer than 5 years and were not included.

Selection of Participants

Initially, there were seven of nine total teachers located at the site identified as potential participants in the study. Two of the participants had received training in special education or had been teaching for longer than 5 years and were not included. The researcher attempted to include all seven participants, but the study was limited with the number of laptops and webcams available to use. Therefore, the number of participants was limited to three.

Three of the original nine potential teachers participated in the study. Participants were chosen based on the number of students identified as Specific Learning Disables (SLD) in their classroom. All participants were certified in the state of Florida to teach in the general education

elementary school setting. All participants graduated from a traditional teacher preparation program, with a bachelor's degree in elementary education and received no training in special education. None of the participants had any experience in teaching in an inclusive classroom or with students with specific learning disabilities. Further, all participants were considered novice teachers in the profession, with less 3 years or less of total teaching experience in a general education classroom. Finally, the participating teachers were in their first year of working with students identified to receive special education services in the general education classroom setting. All participants reported having one course while completing their teacher preparation program specifically aimed at addressing the needs of and identifying effective instructional strategies for students with diverse backgrounds or identified as Specific Learning Disabled (SLD). All participants reported having no experience or training other than the one required course during preparation. Participants also reported having had no professional development specifically designed to address the needs of diverse and students identified to receive SLD services and accommodations.

Table 1. Teacher Preparation Years of Teaching Experience in General and Special Education

	Traditional Teacher Preparation Program	Years Teaching Experience in: General Education	Special Education
Participant 1	Yes	3	0
Participant 2	Yes	2	0
Participant 3	Yes	3	0

Student Populations Present

All classes observed were general education classrooms with special education students being included. Class sizes ranged from 15 to 18 students on average per day during scheduled observations of participants. Students were absent for a variety of reasons including, being sick, and being pulled out of the classroom for testing. Students with specific learning disabilities were the only exceptionality in the observed classrooms observed. In these classes, the number of student identified as SLD ranged from 3 to 5.

Reading Block

All participants taught kindergarten and first grade thus, reading instruction targeted early literacy development. Each student received an initial assessment that determined appropriate placement for small group instruction. Students who were not performing on grade level utilized an individual intervention program designed to address identified areas of concern. Students benefited from the reading program that allotted additional time for classroom reading instruction. The reading block schedule was implemented school wide and consisted of 30 minutes of whole group instruction, 30 minutes of small group instruction and 30 minutes of intensive intervention for struggling readers.

Participant's percentage of activities during the reading block time are listed in Table 2. Classroom reading activities were varied between the teachers. All participants were taught reading during the ninety-minute block schedule. However there was variability in the reading curriculums used in each classroom and the time devoted to different types of reading activities.

Table 2. Reading Activities during Observations

Activity	Percentage Class Engaged
Whole Group Lecture	15%
Small Group Work	70%
Individual Reading	15%

Classroom Demographics

Demographics from each participant's classroom are represented in Table 3.All classes observed were general education classrooms with special education students being included. Class sizes ranged from 15 to 18 students on average per day during scheduled observations of participants. Students were absent for a variety of reasons including, being sick, and being pulled out of the classroom for testing. Students with specific learning disabilities were the only exceptionality in the observed classrooms observed. In these classes the number of student identified as SLD ranged from 3 to 5.

Classroom 1 had 18 total students who were all African American with 11 girls and 7 boys. Of her total students there were three students identified as receiving Exceptional Student Education (ESE). Classroom 2 had 18 total students who were in the Kindergarten. All of the students were identified as African American and there were 9 girls and 9 boys. Of her total students there were five students identified as receiving Exceptional Students Education (ESE). Classroom 3 had 15 total students in Kindergarten. All of the students were identified as African American and there were 6 girls and 9 boys. Three students were identified as receiving Exceptional Students Education (ESE). Prior to the beginning of the study, there were no full-

time highly qualified special education teachers present at the school. At the beginning of the school year student were administered the Iowa Basic Skills Test to determine current academic performance levels. Students were placed based on results with several students being placed in classrooms 1-2 grade levels below their traditional age and grade placement procedure. For example, it was very common to see students who age wise should have been in third grade however they were enrolled in first grade because of academic performance. All students however were identified as being at least one grade level below their current grade placement.

Table 3. Classroom Demographic Information

Classroom	Grade	Students	Free Lunch	ESE/SLD	Male	Female
1	1	18	100%	3	7	11
2	K	18	100%	5	9	9
3	K	15	100%	3	9	6

Instrumentation

Direct Instruction Observation Form

The researcher recorded each participant's average rate of specific feedback on the Direct Instruction Observation Form (DIOF). The DIOF provided a systematic observation tool designed to document the frequency and calculate the average rate per minute of specific feedback provided to students during academic instruction by participants with and without prompting through BIE technology.

Description of the Variables

This study examined the average rate per minute of specific feedback statements made to students during reading instruction by novice teachers in an inclusion classroom. Additionally, the researcher determined the participant's ability to sustain an increased average rate per minute of specific feedback during the withdrawal phase of the study once the intervention of Bug-In-Ear was removed.

Independent Variable

The independent variable was Bug-In-Ear Prompts (BIEP) given to participants in inclusionary classrooms during reading instruction with Bug-In-Ear (BIE) Bluetooth technology. The number of prompts given with BIE by the researcher was recorded with a tally mark in the BIEP column on the data collection instrument as specific feedback provided by the teacher through BIE Bluetooth coaching and prompting. The researcher calculated the average rate of specific feedback statements by: (a) counting the number of BIEP specific statements made in each interval, and (b) divided the total number by 5 to determine the average rate per minute.

Dependent Variable

For the study, the dependent variable was the mean rate of specific feedback provided to elementary school students during reading instruction. The mean rate per minute of specific feedback statements was tallied using the Direct Instruction Observation Form (DIOF). The average rate per minute was determined by; (a) counting the number of specific statements made in each interval, and (b) dividing the total number of specific statements made in each interval by 5 to determine the average rate per minute.

Observations

Pre-Observation

On the day of scheduled observations, participants turned on the computer, logged into SKYPE, called the researcher, turned on Bluetooth headset and confirmed audio reception from the researcher. Prior to the observation, the researcher wrote identifying information on the top of the data collection sheet, and initiated the observation session when the researcher communicated the agreed upon signal. Data collection began when the researcher communicated, “We are live” through BIE provided to the teacher.

During Observation

During the observation, the researcher recorded every instance of specific and prompted feedback on the DIOF but discontinued the observation for major outside interruptions such as announcements, and emergency drills. The researcher continued the observation for minor interruptions such as a pause in instruction, or preparation of instructional materials, and stopped the observation on the researcher’s signal, or after the completion of 3 consecutive 5-minute intervals, whichever came first.

Coaching

The researcher acted as the sole coach prompting participants during scheduled observations during the intervention stage. The researcher was a third year doctoral student in exceptional education with teaching certification in varying exceptionalities K-12 in North Carolina and Florida. The coach prompted participants to provide specific feedback using prompts identified during the initial training sessions.

Phase 1: Baseline (A)

In baseline data collection, participants wore headsets. However, there was no prompting or feedback provided to the participant. The researcher collected data during scheduled observations using the laptop and webcam placed in a location inside the participant's classroom that captured feedback of the participants during scheduled observations during reading instruction.

After baseline data was collected on all participants for 5 observation sessions, the researcher looked to establish a trend in the data. The participant with the lowest average rate of specific feedback per minute, was designated participant 1, and then transitioned to the next phase of intervention. If all participants had demonstrated a low initial average rate, the researcher would have drawn names out of a hat to determine the order for the introduction of the intervention phase.

Phase 2: Intervention (B)

In phase B, the researcher prompted the participant to use specific feedback through Bug-In-Ear Bluetooth technology from a remote location (i.e. university campus) during reading instruction. Through the results of a structured and remote observation, the researcher determined the average rate per minute of specific feedback statements made to students. Observations were broken down into three consecutive, five-minute intervals where the number of specific feedback statements provided to students was recorded. Additionally, the researcher recorded the number of prompts provided during intervention with BIE Bluetooth technology during scheduled observations using the DIOF.

Phase 3: Withdrawal of Intervention (C)

Phase 3 consisted of the complete withdrawal of the Bug-In-Ear (BIE) intervention. During this phase, the researcher no longer prompted participants through Bug-In-Ear (BIE) Bluetooth technology. During pre-scheduled observations, the researcher determined the average rate per minute of specific feedback provided to students during academic instruction without the intervention of BIE. The focus of this phase was on the participant's ability to provide and sustain a higher than baseline average rate per minute of specific feedback statements during reading instruction.

Baseline and Intervention Trend Analysis

Each participant was observed a minimum of five times during baseline to establish a trend. After a trend was established, the intervention phase began. The researcher decided that if participants averaged less than three specific statements per interval would be included in the study an if they averaged more than three specific feedback statements per interval during baseline they would not be included in the study. There were no teachers dropped from the study. During intervention, the researcher prompted the participant for specific feedback using Bug-In-Ear during instructional delivery. Participants who increased their average rate per minute of specific feedback during the intervention phase to an average of four for four consecutive observations transitioned to the next phase of withdrawal. Additionally, the researcher continued to calculate the average rate of specific statements made during each interval observed for participants 2 and 3 who remained in baseline until participant 1 met transition criteria and began the withdrawal phase.

Transition Rules

Transition rules were determined prior to the start of the study (see Appendix E) summarizes transition rules for the study. For the purpose of this study, transition to the next phase was made once participants demonstrated an average of 4-behavior specific feedback statements made per minute for four consecutive observation sessions during intervention. Once participants met the established criteria for the intervention phase, transition to phase 3 (withdrawal of the intervention) began. Once Participant 1 met criteria to transition from phase 2 (intervention) to phase 3 (withdrawal of the intervention), the researcher introduced phase 2 (intervention) to participant 2. Accordingly, as the second participant met criteria to transition into phase 3 (withdrawal of the intervention), participant 3 transitioned from phase 1 (baseline) to phase 2 (intervention) once the participant 2 met transition criteria.

Post-Observation

Once each observation was completed the researcher determined the average rate per minute of specific feedback given to students and charted the data. At the end of the study, the researcher and participants held an informal meeting to discuss challenges, issues and successes.

Coding Data

In order to calculate the average rate of specific feedback provided to students during the observation, the researcher developed specific codes to identify specific and prompted feedback provided during the observation. For the purpose of this study, there were two codes used to record teacher feedback provided to students: (1) Teacher specific (TS), and (2) Bug-In-Ear Prompt (BIEP). The researcher recorded the type of feedback provided to students for three consecutive, five-minute intervals during whole class and small group instruction in reading. The

15-minute observation was predetermined based on the participants' daily schedule for delivery of reading instruction. The session began with a signal from the researcher through the earpiece receiver to the participant that they were "live." The participant then continued the teaching session. The researcher collected baseline data on specific feedback provided to students and recorded the data as TS on the Direct Instruction Observation Form (DIOF). The researcher recorded a tally mark in the corresponding interval for the identified behavior of specific feedback statements.

Intervention sessions began in the same way with the verbal cue that the session was "live". During this phase, the participants received verbal feedback by the coach through the earpiece. The researcher coded prompts given to participants through BIE technology (BIEP). A total count of specific feedback statements made by participants to students was determined at the end of each interval and converted to an average rate per minute of specific feedback statements provided to students during the observation.

Observations that lasted fifteen minutes were included in the study. The researcher completed calculations for the mean rate of specific feedback and inter rater reliability of 90% or more on 30% of observations. The observer coded each scheduled observation using the Direct Instruction Observation Form (DIOF). Another observer logged in during predetermined observation times and coded with the researcher one third of the observations (n=7 per participant) to establish inter rater reliability. During the observation, the researcher and additional observer recorded the type of feedback provided to students. Additionally, both observers noted any pertinent information regarding the observation for descriptive purposes.

Inter-Rater Reliability

The researcher established inter-rater reliability with the DIOF. A second trained observer coded 30% of the observations simultaneously with the researcher from a remote location. During those observations, the second observer logged into the website and recorded the number of specific feedback statements made with and without BIE prompting provided by the researcher on the DIOF. At the completion of the observation, the observer computed a point-by-point agreement ratio with the co-observer. This ratio was useful to determine agreement of whether the desired teacher behaviors occurred or did not occur during the observation (Kazdin, 1982). For each interval, point-by-point agreement was calculated. The number of agreements for the observation period was divided by the number of agreements plus the number of disagreements and multiplied by 100 to form a percentage (Kadzin, 1982).

The co-observer was trained on how to code feedback using the DIOF prior to the beginning of the study. In addition, the researcher and co-observer practiced using the DIOF in a reading clinic for at least three, 5-minute intervals as training for this study and practiced coding specific feedback displayed in a video of teachers during instruction. The recorders used a point-by-point analysis with 90% agreement between the researcher and the co-observer required to include the observation in this study. The researcher and co-observer reached 90% agreement on the observation point-by-point analysis therefore no additional training was needed.

Both the researcher and co-observer simultaneously conducted scheduled observations of novice teachers using laptops, SKYPE and webcams placed in the classroom. In order to include the observation, observers must have: (a) observed the lesson, (b) documented average rate per interval of specific and prompted feedback using the DIOF instrument, and (c) calculated the point-by-point analysis and reached 90% agreement between the researcher and co-observer.

When agreement was not met, the researcher did not include the observation in the study.

Procedures

Obtaining Consent

Permission from the principal to conduct a study in the respective school was requested prior to conducting any research. The researcher obtained consent from teachers, principal, and the Institutional Review Board at a large university in the southeast (see Appendix E for consent forms). Since this site was identified as a charter school and the principal had designated the site as a research site and partner with the university, consent from the local school district was not needed. The principal of the school worked closely with the researcher in determining which teachers would be eligible to participate. The principal granted permission for the researcher to discuss the study with teachers identified as eligible to participate in the study.

The researcher spoke with each teacher on the same day that permission was given by the principal. All eligible participants gave permission and signed the consent to participate in the study.

Participant Training Meeting

Participants who gave consent to participate were required to attend a 2-hour training session on the use of technology, using SKYPE, and Bug-In-Ear (BIE) headset. Each participant received a laptop, Bluetooth headset, wireless adaptor, and camera. Once all participants received the equipment, the researcher demonstrated how to turn on the laptop, log on to the Internet, open SKYPE, and to create a SKYPE account. Next, the researcher trained the participants on how to initiate and answer calls on SKYPE. Finally, the researcher demonstrated how to charge their Bluetooth headset and to change audio settings in order to receive calls

through the wireless headset. Participants were required to successfully complete the set-up process (turn on the computer, log into SKYPE, place a call to the researcher, successfully turn on Bluetooth headset and receive feedback from the researcher four times at the end of the training session, twice from within the same room and twice from another location within the same building). All participants successfully completed four trials prior to baseline data collection.

In order to desensitize both teachers and students to the Bluetooth headset, teachers were required to wear the headset for at least two days prior to initial baseline data collection. During those initial sessions, the researcher observed lessons and provided feedback to participants, unrelated to the study in order to develop teacher confidence. The practice sessions were brief. Teachers were ready to use the headset and webcams after two, 15-minute practice sessions in the classroom setting. The researcher provided examples of feedback when wearing the Bluetooth headset. Voice tone, pitch, and reception in the classroom was tested during the practice phase prior to the intervention phase. Data collection began when the researcher communicated, “We are live” through BIE provided to the teacher.

Prompt Examples

Prior to the beginning of collecting baseline data, each participant was required to individually complete half-day training with the researcher. During this training, examples were provided to the participant of specific feedback statements and coaching prompts that would be used during the intervention phase when wearing the Bluetooth headset. Table 4 provides examples of the types of prompts that would be heard by the participant.

Table 4. Example Prompts

Prompt or Feedback	Example
Clarify	Say, "Let me ask you a different way," and then ask a single question, that is clearly defined.
Reinforce	Provide specific feedback for desired student responses such as, "Yes that is the name of the main character in the story."

Scheduling Observations

The dates for observations were assigned based on each participant's scheduled reading instruction time. Because the entire school is on block scheduling, the entire school scheduled reading for 90 minutes every morning from 8:30 am to 10:00 am. All participants were aware of observation times and dates. The researcher coded observations for three consecutive five-minute intervals during reading instructional time. Observations were scheduled over a one-month time period between May and June 2010. All conflicts with the schedule including, school holidays, teacher workdays and student off days, resulted in alternate observation times.

Technology

The researcher observed participants on scheduled days, with a webcam in their classroom as they taught whole and small group instruction in reading.

Equipment and Software

The equipment required to deliver immediate prompts included a Macintosh Computer, Logitech webcam and microphone and SKYPE a Voice Over Internet Protocol (VOiP). VOiP software connects computers together through the computer. SKYPE is user and operator friendly, free, and allows chat and video conferencing. For the purpose of this study, SKYPE

was downloaded and installed onto classroom computers. The researcher used SKYPE in order to provide participants the ability to receive calls, receive immediate prompts through Bug-In-Ear (BIE) technology and for the researcher to complete teacher observations from a remote location. Observations completed from remote locations with SKYPE provided the researcher with data on teacher behaviors where instruction and classroom dynamics were not interrupted by the physical presence of the researcher in the classroom. The camera focused on the teacher and not students. There was no recording of students or teachers during the study and data was collected during scheduled observation times between the researcher and participants. For this reason, the camera was located in the most natural and discreet place, which usually was of on the top of a bookcase in the back of the room.

Participant Set-up

All participants were provided with laptops and bug in ear equipment, which consisted of a Bluetooth headset, wide-angle webcam, and Bluetooth Wireless Adaptor. All laptops had the following software installed: (a) SKYPE, (b) an Internet browser, and (c) quick cam drivers. Prior to the scheduled observation, participants called the researcher using SKYPE in order to set-up for the observation, ensure that all components were operating correctly, and discuss the lesson for the day. The prep call allowed the researcher to address any questions from the participant and rectify issues with technology that might occur. Calls that exceeded ten minutes to correct technology issues resulted in the researcher and participant rescheduling for a later time. The limited timeframe to address technology issues was incorporated as a means to minimize the disruption of reading instruction in the classroom. Additionally, the researcher verified position and placement of the laptop to ensure the entire classroom was visible.

Bluetooth headset capabilities were tested as well. To ensure clear communication, teachers in their respective classrooms tested sound and voice quality in every corner of the room, and the quality of prompting provided through the Bluetooth headset.

Teacher Interviews

Following the completion of the scheduled observations for each participant, the teachers were asked to complete an informal interview designed to identify the successes and barriers to the study. The researcher was interested in the determining if the teachers were open to receiving this type of assistance in the classroom. The researcher recorded the interviews with the participant's permission and later transcribed the tapes.

Data Analysis

Within single-subject research designs, data are analyzed concurrently while data are collected using visual inspection and trend line analysis (Kazdin, 1982). A cumulative graph of the average rate per minute of specific feedback provided to students during reading instruction with and without Bug-In-Ear technology was analyzed. The researcher completed a visual analysis of the data. Although statistical analysis could be conducted, historically the analysis of a single-subject multiple baseline (ABC) study involves a systematic visual comparison of the outcomes of participants across various stages of the study (Kazdin, 1982). The researcher analyzed specific data points to identify any visible patterns in order to make clear and concise inferences that changes in the dependent variable were the direct result of the manipulation of the independent variable. Through visual analysis the researcher determined whether the change in the dependent variable was directly attributable to the identified intervention. Data was plotted

using a line graph to make visual inspections and the determination of a causal relationship between the intervention and dependent variable.

Percentage of Non-overlapping Data

A secondary analysis Percentage of Non-overlapping Data (PND) was completed. PND was calculated by examining the percentage of intervention data points that did not overlap with the highest baseline data point (Bellini, Peters, Benner & Hopf, 2007). The researcher drew a horizontal line from the most extreme data point in baseline and extended the line through the intervention condition phase (Bellini, Peters, Benner & Hopf, 2007). Scruggs and Mastropieri (1998) identified the following guidelines for interpretation of PND: Percentage of non-overlapping that were greater than 90% represented very effective treatment, 70-90% effective, 50-70% questionable, and below 50% ineffective.

Social Validity

Social validation is defined as the level of social significance of a project, fidelity of implementation, and having high social importance (Horner, Carr, Halle, McGee, Odom & Wolery, 2005; Wolf, 1978). This study presented an intervention aimed at enhancing the support provided to novice teachers in an effort to increase the retention of beginning teachers in special education classroom settings. Through innovative induction support and the integration of technology, beginning teachers received immediate feedback and prompting through Bug-In-Ear (BIE) technology. Further, through enhanced support for beginning teachers, mentors, supervising teachers and administrators had the capability to support more teachers with Bug-In-Ear Bluetooth technology. Finally, the researcher interviewed participants to determine if participants felt supported in the classroom with Bug-In-Ear technology and the level of comfort

participants had with using new and innovative methods for mentoring novice teachers during the initial years in a new classroom environment.

Summary

This chapter presented the research methods for this study in examining the effectiveness of providing immediate prompting and feedback through Bug-In-Ear Bluetooth technology. Specifically, this study examined the rate of specific feedback provided to students during reading instruction. The research methods presented in this chapter included, setting, participants, pre, during and post data collection procedures, instrumentation, research design and data analysis. Furthermore, the chapter included a description of the dependent and independent variables.

CHAPTER FOUR: DATA RESULTS

The purpose of this study was to determine if instructional coaching using Bug-In-Ear Bluetooth technology increased the rate of specific feedback provided to student during reading instruction. The researcher used a multiple baseline across participants and settings for visual analysis of plotted data. The researcher also collected data with informal interviews with all participants. The results of all data collected will be presented in this chapter. Additionally, this chapter addresses observation schedules, implementation and protocol for equipment use and technology requirements.

Observations

Eighty-four observations were coded for the study. Each participant was observed twenty-eight sessions. Each observation was broken into three five-minute intervals for a total of 15 minutes for each observation. Twenty-one of the observations were not included in the study for various reasons. These 21 sessions were not included due to teachers being called out of the classroom, school assemblies and participants not being present for the scheduled observation.

Inter-Rater Reliability

Table 5 provides data on the Inter-Rater Reliability across all participants. The co-observer was trained on coding procedures prior to the beginning of the study. The recorders used a point-by-point analysis with 90% agreement between the researcher and the co-observer required to include the observation in this study. The researcher and co-observer reached 90% agreement on the point-by-point analysis and no additional training was needed on coding observations. Of the total 105 observations scheduled 84 were included. Thirty percent of 105 observations were coded to assess for treatment integrity. Two observers logged into SKYPE,

called the participant and recorded the frequency of specific feedback statements made to students on the DIOF. At the end of the observations the researcher calculated a total agreement on the rate of specific statements made of statements made between the researcher and additional coder's for the study. Participant 1 had an inter rater reliability that ranged from 98 to 100 with a mean of 98 % agreement between observers. There was 100% agreement for participant 2 and participant 3 ranged from 97 to 100 percent with a mean of 98 percent agreement between observers.

Table 5. Inter-Rater Reliability

Participant	Mean	Range
1	98.0	98-100
2	100	100
3	98.0	97-100

Fidelity Checklist Decision Rules

30% of all observation sessions per participant were assessed for the fidelity of implementation (See Appendix C). Observers recorded the frequency of specific feedback during prescheduled observations and calculated the average rate per minute. Table 5 provides the mean performance for each participant using the Direct Instruction Observation Form (DIOF). Overall, the average rate per minute of specific feedback provided to students increased. Checklists were used to assess the accuracy of data collection. Table 6 provides outcomes for all participants.

Table 6. Assessment of Treatment Fidelity using the Direct Instruction Observation Form

Participant	Number of Observations	Average Rate of Specific Statements
1	28	2.8
2	28	3.0
3	28	2.9

Data Analysis

This study examined two research questions. Research question one, "Does immediate teacher prompting by an instructional coach with Bug-In-Ear (BIE) Bluetooth technology increase the mean rate of specific feedback given to students?" The second research question asked, "Given an increase in mean rate, to what extent does the increased average rate of specific feedback sustain during the maintenance phases of BIE?" A single subject, multiple baselines across participants design was included for analysis and Percentage of Non-Overlapping Data (PND) was calculated by ascertaining the percentage of intervention data points that do not overlap with the highest baseline data point (Bellini, Peters, Benner & Hopf, 2007). PND calculations were utilized to determine the effects of specific feedback provided to students during reading instruction..

Problems with Observations and Coding

Technical difficulties and incidences of audio issues presented problems for the observers in coding of observations. On 3 occasions observations could not be initiated because of technical difficulties with the Bluetooth audio working properly. On three other occasions, the Internet was not working and therefore no communication between the coach and participant was established within a reasonable amount of time without interrupting the delivery of instruction. Initially, despite having set forth a protocol and going through processes and procedures for

observations to take place, issues with technology consistently affected this study. Issues included; computers not picking up wireless signals from the adaptor and therefore the Bluetooth earpiece did not operate correctly. The school Internet at times was down or had a slow connection which caused a delay in the transmittal of communication. At random times once there was a good connection established and the observation was in action, connections made through SKYPE were dropped which required the participant to reconnect during the lesson. Reconnection would have caused a disruption of instructional delivery, so the scheduled 15 minute observation ended prior to the scheduled time.

Another daily issue was audio connections between Bluetooth headpieces and laptops used during the study. Audio issues took place daily during the observations as well. Every day during the preconference meeting, participants reported having technical issues of not being able to hear the researcher despite indications of Internet and Bluetooth earpiece connections. Further, at times during scheduled observations communication between the researcher and participant was delayed by three to four seconds causing a delay in the feedback given to both participants and students in the classroom. When audio and connection issues took place participants were forced to reboot the computer and logged back into SKYPE to reestablish connection. It is extremely important to note the reboot process was slow and took on average 3 to 5 minutes to complete therefore after one attempt to reboot the computer, the reading lesson usually needed to begin and at times this meant that observations would not be included in the study due to technical difficulties.

Obstacles to Obtaining Consent

One initial obstacle emerged in the area of teacher attitudes toward participation in the study. All teachers expressed concern regarding having the web cam in the room. All teachers feared that the principal might look into their room during unscheduled observations and felt like "big brother" would be watching at any given time. The researcher addressed concerns of participants and after answering questions regarding the process and protocol for observations to take place, teachers appeared to be more receptive to the study and agreed to participate.

The researcher was a familiar and trusted individual who worked at the school and provided ESE support to teachers. Because of this relationship established with participants from the very beginning of the school year, participants felt comfortable participating in the stud and welcomed the integration of technology as a means for improving instruction. Additionally, participants were informed that participation in the study would in no way have an impact on or effect traditional end of year performance reviews completed by the school principal.

Challenges Faced by Teachers During Observations

Despite having predetermined observation schedules during the reading block, the researcher encountered several conflicts and challenges throughout the study. First, regardless of predetermined schedules for observations, teachers were pulled during the reading block for reasons that included: (a) being called out of the classroom to the office, (b) dealing with severe behaviors that took place in the classroom, (c) discipline meetings with the guidance counselor, (d) coverage issues when teachers were off campus due to professional development or personal reasons and (e) last minute visits from city officials and major sponsors which disrupted the schedule for the day. Additionally, at times participants were required to cover and teach two

classes combined together because of teachers being absent. When classrooms were merged, participants were responsible for covering twice the number of students and were forced to change or modify the lesson and the researcher was unable to use the observation.

Regardless of challenges with technology and schedules, data collection did take place with visual analysis of the data points to determine the effectiveness Bug-In-Ear Bluetooth technology as a means for providing beginning teachers with immediate feedback. There were 24 successful observations that were included in data analysis and results for each participant are discussed below.

Loss of Experimental Control

Teachers frequently were required to attend professional development on predetermined Wednesdays throughout the year. During the study, participants attended a professional development session aimed specifically at providing specific feedback to students. After the completion of this workshop all participants increased their average rates of specific feedback however the significant increase was only witnessed during observation 9 which took place one day after the professional development workshop. Loss of experimental control took place during the intervention stage for participant one however the researcher regained control with the extension of intervention and baseline sessions for all participants. Additional baseline data points were counted and for all participants experimental control was regained.

Research Question 1

The first research question focused on the ability of the participants to increase average rates of specific feedback provided to students when prompting and coaching with Bug-In-Ear technology. Research Question 1 asked, “Does immediate teacher prompting by an instructional

coach using Bug-In-Ear (BIE) Bluetooth technology increase the average rate of specific feedback given to students?"

Results

Figure 1 presents the results for all participants in the study using Bug-In-Ear technology to increase the average rate per minute of specific feedback provided to students during whole and small group instruction in reading. These results respond directly to Research Question # 1, "Does immediate teacher prompting by an instructional coach with Bug-In-Ear (BIE) Bluetooth technology increase the mean rate of specific feedback given to students"

Participant 1

The top graph represents participant one, the first teacher to receive the intervention of immediate prompting and coaching with Bug-In-Ear technology. During baseline participant one's average rate per minute of specific feedback statements provided to students was low, peaking on average with less than one specific feedback statement per minute. Intervention started on session 7. During intervention participant one's average rate per minute of specific feedback statements provided to students increased almost 300% to 3.67 specific feedback statements made on average per minute. During the intervention stage, there was some variability ranging from 3.03 to 3.89 specific statements made per minute. Variability in the average number of specific statements could be accounted for since each lesson was different and within each lesson there were varied opportunities for the teacher to respond to student comments and behaviors. This increase in specific feedback provided to students during reading instruction demonstrated an effective intervention. During maintenance, participant one's

average did drop however the average rate of specific statements was higher than baseline averages. Finally, a PND analysis was completed with 100%.

Participant 2

Figure 1 presents the results for participant 2 who was the second teacher to receive the intervention of Bug-In-Ear prompting and coaching. During baseline, participant two's average rate per minute was low however a consistent increase in the number of specific statements was evident based on data and the average rates calculated after every observation. Intervention phase was initiated on session seventeen. After one session of intervention participant two's average rate per minute of specific feedback provided to students during whole and small group reading instruction increased immediately to an average of over three specific feedback statements per minute with some degree of variability. Throughout the intervention sessions with BIE prompting and coaching, participant two's average rate per minute ranged from 3.47 to 4.20 specific statements on average per minute. Participant 2 transitioned to maintenance on session 23. During maintenance participant 2 average rate of specific statements remained above baseline averages however the rate decreased from 3.80 to 3.07. Finally, a PND analysis was completed with 100%.

Participant 3

The third graph of Figure 1 presents the results for participant 3. During baseline participant three's average rate per minute of specific feedback statements provided to students was low, however there was a consistent increase in the average rate of statements made throughout baseline. When the intervention was applied beginning on session 24, participant three's average rate per minute of specific feedback statements provided to students increased to

3.53 specific feedback statements made on average per minute. During intervention, there was variability ranging from 3.27 to 3.53 specific statements made per minute. Variability in the average number of specific statements however could have been this participant reacting to various outside factors including the smallness of the school and the ability of the participants to talk to each other about the study and specifics of the intervention. Additionally the variance of this participant could be accounted for because each lesson provided students with varied numbers of opportunities to respond to the teacher. Throughout baseline phase however, participant three's average rate per minute of specific feedback continued to rise without the use of any intervention of Bug-In-Ear increasing from 0.80 to 3.13 specific feedback statements made on average per minute during baseline.

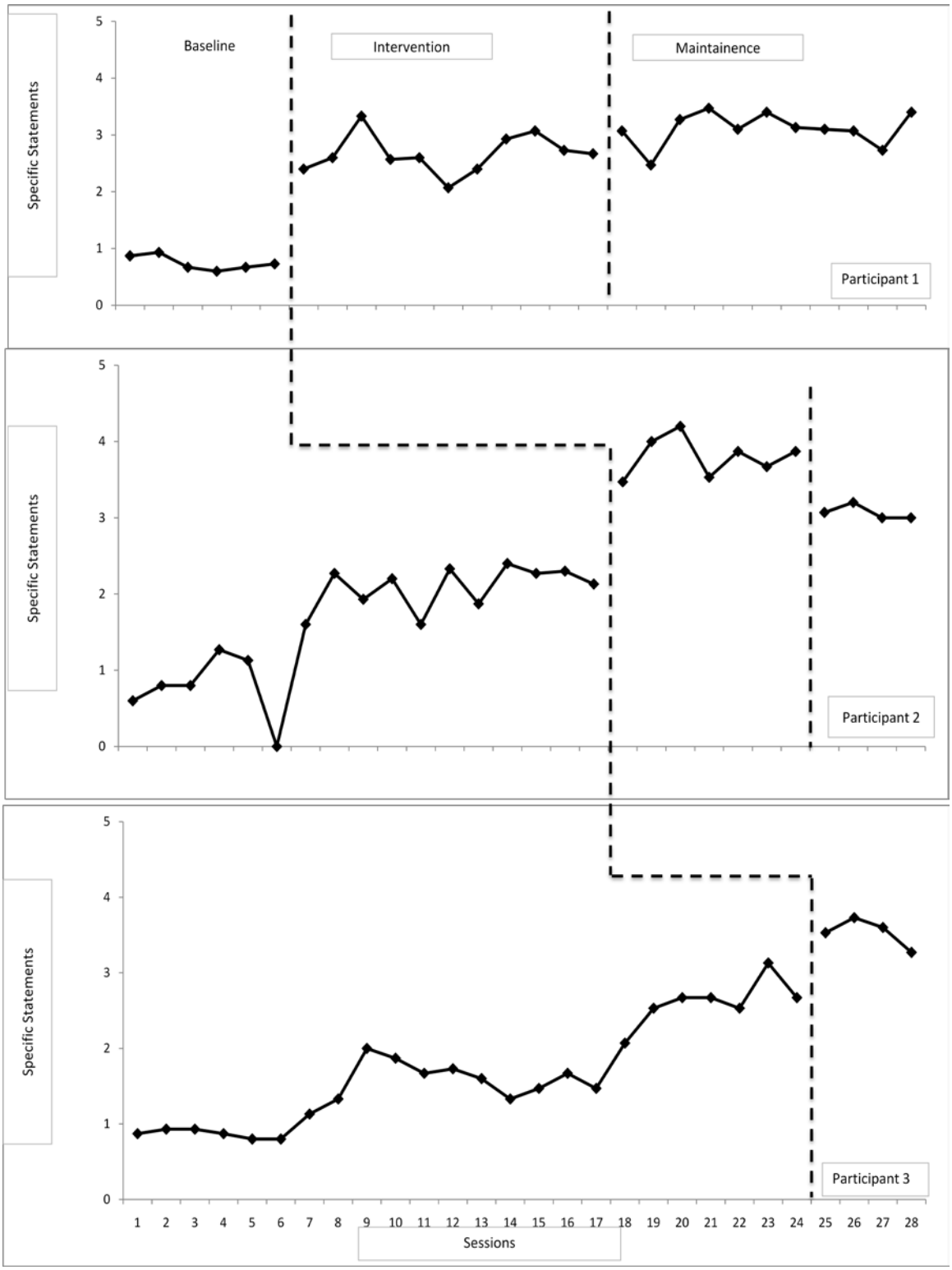


Figure 1. Participant Results

Research Question 2

The second research question focused on the ability of the participants to maintain increased average rates of specific feedback provided to students when prompting and coaching with Bug-In-Ear technology was withdrawn. Research Question 2 asked, "Given an increase in mean rate, to what extent does the increased average rate of specific feedback sustain during the maintenance phases of BIE?"

Results

Participant 1

Table 7 summarizes all participants' data results during baseline, intervention and maintenance phases. Participant 1 began the maintenance phase starting on session 17. During this phase of the study, BIE Bluetooth was still in place however, the participant received no prompting or coaching. Although there was a slight decrease of the average rate per minute of specific feedback statements provided to students during reading instruction, participant one's average rate was higher than baseline averages. During maintenance, participant one's average rate per minute decreased to 3.10 specific statements made per minute however the participant maintained over a 200% increase of specific statements on average per minute during reading instruction as compared with baseline. Despite the participant never meeting the established criteria to transition to maintenance phase, the researcher implemented the maintenance phase given the significant and increased rate of specific statements made on average than baseline stage.

Participant 2

Participant 2 transitioned to the maintenance phase on day 24. Visual analysis of data indicated participant 2 maintained a higher average rate of specific statements made than baseline. Participant 2 average rate decreased slightly falling from 3.80 to 3.07 specific statements made on average per minute. Throughout baseline, participant 2 average rate was 1.62.

Participant 3

Participant 3 transitioned to the intervention phase on day 24. Participant 3 demonstrated a consistent increase in the average rate of specific statements made during reading instruction while in baseline and during the intervention phase of the study. Visual analysis of data indicated participant 3 maintained a higher average rate of specific statements than during baseline data collection. Participant 3 was unable to complete maintenance phase, however throughout the study participant 3 consistently increased the average rate of specific feedback provided to students during the reading block.

Table 7. Participants Summary Data Results during Baseline, Intervention, and Maintenance Phases

Participant	Baseline	Intervention	Maintenance
Participant 1			
Mean	.75	2.73	3.28
Range	.60 - .93	2.40 – 3.47	3.10 – 3.47
Participant 2			
Mean	1.62	3.80	3.07
Range	.60 – 2.47	3.47 – 4.20	3.00 – 3.20
Participant 3			
Mean	1.70	3.53	---
Range	.80 – 3.13	3.27 – 3.53	---

Teacher Discussion Comments

In an effort to capture as much data as possible, the researcher asked all participants a series of informal interview questions after the completion of the study. All participants' responses are included. Each informal interview was scheduled at the convenience of the participant and took place in their respective classrooms. Each interview was recorded with permission of the teacher and transcribed and coded for trend identification. Although the participants varied in opinions, their topics of discussion were largely the same. Major discussion topics included training for dealing with students identified with disabilities, behavior of SLD students and dealing with technology in the classroom. All of the participants who responded to the informal interview questions had less than five years total teaching experience and no training or experience in teaching students identified with disabilities in their classrooms. Appendix includes a sample of questions.

Classroom Dynamics

All of the teachers talked about teaching students in special education in the general education setting as a good thing for the student but emphasized the need for professional development and training on working in inclusionary classrooms. There were some positive comments made by the participants regarding the inclusion of students with disabilities into the general education classroom:

> I can see why it is good to have all students in the same classroom but we need to be trained on how to best serve those students because if not the behaviors really take over and I end up dealing with this all day long.

Another teacher indicated:

I definitely want everyone in my class but I really need the training and support to help because if not it can really affect the learning of the other students and then it's not fair to them.

All of the teachers offered comments on students' behavior in the classroom:

I can definitely see the behaviors and the younger the student s are the more severe the acting out is. These students are barely able to communicate what's going on inside and if they don't understand something they sometimes don't have the knowhow to tell you so they act out and if you don't catch it early the acting out can escalate and then I have other students playing the copycat game and then everyone is acting out.

For me the behaviors were very obvious from the beginning. I knew something was wrong but I didn't know how to do anything else different other than the things I was taught in school and most of that stuff didn't work so I was really struggling because I didn't know how to help and the behaviors really affected the class and the culture of the classroom.

I was in trouble from the very beginning anyway and as far as I was concerned they all had behavior issues. After awhile when we did finally get into a routine it was those kids who were in ESE that really seemed to struggle. Even after a few months into the year and they still were just like fighting or something and I didn't know what it was but when we found out that some of the students were in ESE and had IEP or whatever we just didn't know.

Technology

All teachers expressed varying levels of concerns when it came to integrating technology into their classrooms. Although teachers expressed individual levels of comfort all expressed general concerns for when and how the observations would take place. Teachers also reported both feeling a great sense of support during the study when wearing the earpiece but a level of hesitation when it came to the virtual observations:

> The one thing that I really liked and was surprised about was having the extra eyes and support. I felt like once I knew what was going on and grasped the concept it was ok and cool.
>
> We had one situation when the kids were doing something and Ms. Wade told me something in my ear and I was like so and so sit down before he could even move. He was like how did she do that and pretty much cut him off at the pass before he could even get started.
>
> When we finally got everything working I felt like I had some more help and eyes in the back of my head. And I really wished we could have just kept the camera on all the time.
>
> I liked the fact that I really did have someone else seeing the things that really go in my classroom because truthfully no one would really believe me so I felt good that way and the fact that we could really see what was triggering everything.
>
> Honestly sometimes it was just good to have someone else in the room with experience in behavior or had new strategies. I just was at wits end with some of these kids so any new ideas were good to me.

Summary

This chapter presented the results of the data analyses procedures, which included: (a) visual analysis, (b) PND Analysis, (c) and Inter-rater Reliability. Additionally, one of the major findings from the study confirmed Scheeler and Lee, (2002, 2004) and Rock, Gregg, Thead, Acker, Gabel & Zigmond, (2009) research using BIE Bluetooth technology that provided novice teachers with immediate feedback during instructional delivery. With the use of BIE, novice teachers increased the average rate of specific feedback provided to students during reading instruction. Additionally, this study demonstrated that teachers who received instructional coaching through BIE technology maintained a higher rate of specific feedback during the maintenance phase and BIE support was removed. The following chapter concludes with a discussion on implications for future research and, implications for future practice.

CHAPTER FIVE: DISCUSSION

This chapter begins with a brief review of the results from Chapter 4. The findings with previous research noting consistency and/or incongruence within the literature are discussed. Finally, the chapter concludes with a discussion of the (a) limitations of the study, (b) implications for future research, and (c) implications for practice.

Summary of Study

The current study focused on providing immediate feedback and coaching through Bug-In-Ear Bluetooth technology to novice teachers in inclusionary classroom settings. Specifically, the researcher was looking to increase the mean average of specific feedback statements provided to students during reading instruction. The teacher's rate of specific feedback was the dependent measure. Specific feedback has been identified as a quality of effective teachers that potentially increases the level of student engagement and performance in the classroom. A second purpose of this study addressed the maintenance of above baseline average rate of specific feedback provided to students.

Discussion of Results

The findings from this study are consistent with previous research. Scheeler &Lee, (2002) conducted a study examining the effects of immediate feedback provided to three novice teachers completing their student teaching requirements through Bug-In-Ear technology. This multiple baseline research design was used to evaluate the effectiveness of immediate feedback delivered via a wireless FM listening system. Researchers found immediate feedback compared to delayed feedback was an effective means to increase specific desired teacher behaviors.

A criterion for participants to transition from baseline to intervention was based on direct instruction and did not incorporate small or whole group instruction. Based on the direct instruction model where there are significantly more opportunities to respond to students, the researcher set the average mean rate of specific statements significantly higher and consequently, participants struggled to meet the goal of averaging four specific statements made to students during reading instruction. Research on the average rate of specific statements provided to students during whole and small group instruction continues be an area identified for future research. Future research would benefit from a lower average where teachers would be required to provide 2 specific feedback statements per minute.

Research Question One

The first research question focused on the impact of immediate feedback and instructional coaching provided to beginning teachers through Bug-In-Ear Bluetooth technology in reading instruction. Specifically, the question asked, "Does immediate teacher prompting by an instructional coach with Bug-In-Ear (BIE) Bluetooth technology increase the mean rate of specific feedback given to students?" Numerous studies have investigated the impact of providing beginning teachers with immediate feedback. Scheeler, Ruhl & McAfee (2004), examined the effects of immediate feedback with Bug-In-Ear (BIE) technology to increase specific teaching behaviors, and the acceptability of the integration of technology as a means for supporting beginning teachers with immediate feedback. Scheeler, et al., (2004) used a multiple baseline design, which provided immediate feedback delivered via wireless technology. Five beginning special education teachers participated in the study, which demonstrated that immediate feedback delivered via BIE increased desired teacher behaviors.

Research Question Two

The second question in the study focused on the ability of participants to maintain a higher than baseline average of specific feedback statements provided to students. Specifically, research question two asked, "Given an increase in mean rate, to what extent does the increased average rate of specific feedback sustain during the maintenance phases of BIE?" All participants demonstrated an increased average rate of specific statements provided to students during the intervention stage. Participants one and two also maintained a higher that baseline average during the maintenance phase of the study. Similar results were found by Rock, Gregg, Thead, Acker, Gabel & Zigmond, (2009) who reported all teachers in the study increased specific feedback provided to students in general and special education classrooms. Findings were not consistent with Scheeler (2008) who identified the inability of beginning teachers to generalize teaching behaviors across multiple environments.

Implications for Coaching

One of the most significant aspects of this study presented itself in the form of the relationship between the researcher and participants who received instructional coaching. The relationship between the instructional coach and individual participants was essential. The stronger the relationship between the instructional coach and participant the easier it became for the coach to provide feedback. Additionally, the delivery of feedback to students was seamless and took participants no longer than 3 seconds to translate suggestions into practice. Participants reported feeling at ease with having both the researcher communicating with BIE technology and the presence of a camera in the classroom. Finally, because of strong relationships between instructional coaches and participants, time required to train participants to use all equipment and

software was minimal at best. This training originally planned for a two-hour block ultimately only required 30 minutes.

Participants were quick to point out that not just any one could be a coach. Participants completing the study were given the opportunity to discuss strengths and weaknesses of this study. Although all participants were informally interviewed themes emerged from the discussion, which included feelings of additional support in the classroom. In general all teachers felt a sense of additional support with BIE. Teachers reported feeling supported and having an extra pair of eyes to watch the classroom. Major discussion topics included professional development addressing the needs of students with disabilities, behavior of SLD students and including BIE in the classroom. Participants felt overwhelmingly the need for additional training in dealing with students from diverse backgrounds and with learning disabilities in inclusion classrooms. Although BIE is not considered a formal strategy to increase the development of novice teaches' this method of support for participants in this study was extremely helpful. Teachers reported that despite not having formal training in their teacher preparation program addressing the needs of students from diverse backgrounds, Bug-In-Ear was effective in providing participants a sense of additional support in the classroom. Although initially the researcher was interested in the rate of feedback provided to students, coaching opportunities were presented for both academic instruction and behavior management. All participants reported feeling an increased ability to manage inappropriate classroom behaviors and felt a sense of increased time on task and student engagement in the classroom.

Limitations of the Study

The results of the study should be interpreted with caution, as there are limitations with the research design, sampling, and instrumentation. Through the acknowledgment of the limitations, researchers may gain insight regarding the direction for future research. Two major events potentially affected the results of the study. First the environment and school were small and provided the participants multiple opportunities to discuss the study including what specific teacher behavior the researcher was looking to increase during intervention. Next on at least one occasion of professional development, all participants were provided with training on providing students with specific feedback during all instruction. Because teachers were required to attend the workshop, removing participants from the seminar was not possible.

Sampling

Purposive sampling was employed in this study with three novice teachers volunteering to participate in the study. Although purposive sampling is used to capture one or more specific predefined groups (e.g., new teacher; Frankel & Wallen, 2009), there are noted limitations with this type of sampling. Since purposive sampling is a deliberate effort to obtain representative samples by including subgroups within the population (e.g., level of school setting and geographic representation), the probability exists that those who participated in the study may be different from the actual population, introducing a potential of source bias (Gall, Gall, & Borg, 2005). Further, a very specific type of school environment and classroom demographic (charter school, inclusive classrooms) were used for the study and results may not be generalizable to larger general and special education classrooms.

Observations

The researcher would be remiss in not discussing the conflicts with observation scheduling. Despite the entire school conducting reading and reading enrichment during designated times, there were times that observations needed to be rescheduled for a variety of reasons including the participant being out sick, issues with technology and scheduling conflicts. The observation times were significantly shortened which decreased the number of observations finally included in the study. In addition, the school year ended before all participants could complete all phases of the proposed study.

Implications for Practice

The findings from the present investigation offer implications for increasing teacher effectiveness and developing innovative induction programs for the 21st century classroom. The following section presents implications for colleges, universities and local school district induction programs. The findings also indicated that novice teachers who require increased support during the initial years of teaching can receive immediate feedback while implementing effective instructional strategies. Regardless of what a principal or supervising teacher may observe, their ability to pinpoint very specific strategies that can be effective in diverse classrooms with diverse students as well as their ability to support novice teachers as they implement those strategies becomes crucial in the development of beginning teachers' dispositions and delivery of instruction.

The findings from this study and previous research (Korner & Brown, 1952; Scheeler, 2008; Scheeler, Macluckie & Albright, 2008; Rock et al., 2009; Rock et al., 2010) indicate that with the use of Bug-In-Ear Bluetooth technology, novice teachers were able to increase desired

teaching behaviors. Specifically, novice teachers in general education inclusionary settings were able to increase their average rate of specific feedback provided to students in reading instruction. Therefore, through the integration of technology with induction the support of beginning teachers can now almost instantly increase in terms of the number of observations that can be completed by a mentor teacher and the ability to provide those beginning teachers with immediate feedback in the delivery of instructional strategies.

Implications for Future Research

Based on the findings from this study, future studies can provide additional information on the impact of using Bug-In-Ear Bluetooth technology in an induction program as a means to support novice teachers in various learning and social environments. With the evolution and integration of technology into the field of education coupled with access to technology in the school systems themselves, the ability to support more teachers, more frequently with immediate feedback on delivery of effective instructional strategies is now a reality. Technology opens the door for future beginning teachers to receive unprecedented induction support and immediate feedback during their initial years of teaching in special and general education classrooms. No longer are supervisors or mentors required to sit unobtrusively in the back of the room to observe teachers and plan for a follow-up meetings to discuss results and offer suggestions on instructional techniques and delivery methods. With the integration of technology supervisors, mentors and novice teachers experience what is happening in the classroom in the most naturalistic state and in real-time. Further, with the introduction of technology into induction programs, beginning teachers are now afforded the opportunity to have immediate support during critical classroom interactions between student and teachers. Additionally, technology

now offers another way for local school districts and institutions of higher education to collaboratively support beginning teachers with virtual induction strategies.

Finally, future research aimed at providing students in general and special education classrooms with immediate feedback, and prompting while they are in-flight warrants examination. As districts work to become completely inclusive, identifying new and innovative methods helping teachers support students with disabilities in the general education classroom is essential. Through the integration of BIE into programs as a method of providing diverse and students with disabilities support and feedback in the general education classroom is coming. Additionally, this method of BIE provides students with support in an individualized, personal, and unobtrusive meaner as they work to transition or remain in the general education setting.

Conclusion

Those who design teacher preparation programs must recognize that effective preparation is more than just building a ready supply of initially well-prepared teachers, but more importantly teacher preparation and schools should support beginning teachers as they develop the knowledge, skills, and dispositions that will enable them to thrive and meet the needs of all students. This study investigated the effects of using technology to provide immediate feedback to novice teachers during instructional delivery. The findings indicated that effective teacher behaviors were increased using technology and instructional coaching. The results of this study indicated that not only did the rate of the effective behavior increase during the intervention phase but also the behavior was sustained when the intervention was withdrawn. Coaching with the use of technology offers increased levels of support for novice teachers who are in need of support during the early years of their career. Conversely, those teachers who have significant

experience in the classroom yet are struggling with diverse students and those eligible for special education services will also profit from coaching and immediate feedback on specific instructional strategies used in the classroom. Furthermore, the findings indicate the need for new teachers in urban settings to engage in induction and mentoring programs to help with the transition into diverse and inclusionary classrooms. Finally, as districts search for ways to cut cost while increasing support services for beginning teachers, technology and the impact that it can have on induction, attrition and the retention of those new teachers could be profound. With the cost of equipment needed to support new teachers being minimal compared to travel reimbursement and the recruitment efforts needed for those teachers who do leave within the first few years, districts would benefit by incorporating technology into their plans as a means for increased induction support during those critical initial years of teaching.

APPENDIX A: IRB APPROVAL FORM

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Wanda Wade** and Co-PIs: **Lee S. Cross, Rebecca A. Hines**

Date: **March 29, 2010**

Dear Researcher:

On 3/29/2010, the IRB approved the following activity as human participant research that is exempt from regulation:

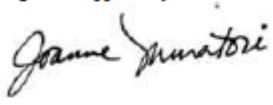
Type of Review:	Exempt Determination
Project Title:	Preparing Teacher's for 21st Century Diverse Students: Bug-In-Ear Support for Novice Teachers in Inclusionary Classrooms.
Investigator:	Wanda Wade
IRB Number:	SBE-10-06845
Funding Agency:	
Grant Title:	
Research ID:	n/a

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Joseph Bielitzki, DVM, UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 03/29/2010 10:25:28 AM EST



IRB Coordinator

APPENDIX B: DATA COLLECTION PROTOCOL

The researcher will be providing teachers with immediate feedback through Bug-In-Ear (BIE) Bluetooth technology. Data collection will begin when the researcher communicates, “We are live” through BIE provided to the teacher.

Data collectors will:

1. Write the identifying information on the top of the data collection sheet
2. Initiate the observation session when the researcher communicates the agreed upon signal.
3. Record every instance of general, specific and prompted feedback
4. Stop the observation for major outside interruptions such as announcements, and emergency drills. Continue the observation for minor interruptions such as behavior, pause in instruction, or preparation of instructional materials.
5. Stop the observation on the researcher’s signal, or 30 minutes, whichever comes first.
6. Determine the average rate per interval of specific, general and prompted feedback for the observation.
7. Chart the data

APPENDIX C: DATA COLLECTION INSTRUMENT

Data Collection Instrument

Rev. 8/23/07

Teacher: _____ Date:

Observer _____ Lesson # _____

Group Size _____ # of Instructional Days Since Last Observation

Teacher Feedback	5 Minutes	5 Minutes	5 Minutes	5 Minutes	5 Minutes	5 Minutes
General						
T Specific						
BIEP						
	Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6
Comments						

Marchand-Martella, Lignugaris/Kraft & Pettigrew, 2007

Marking Legend

T Specific = Teacher Feedback Specific

BIEP = Bug-In-Ear Promt

Observer Notes:

Timer:

Start _____ **Finish** _____

Data collectors will:

1. Write the identifying information on the top of the data collection sheet
2. Initiate the observation session when the researcher communicates the agreed upon signal.
3. Record every instance of general, specific and prompted feedback
4. Stop the observation for major outside interruptions such as announcements, and emergency drills. Continue the observation for minor interruptions such as behavior, pause in instruction, or preparation of instructional materials.
5. Stop the observation on the researcher's signal, or 30 minutes, whichever comes first.
6. Determine the rate, and frequency of specific, general and prompted feedback for the observation.
7. Calculate rates per minute for the participant

APPENDIX D: TRANSITION RULES

Condition	Transition	Decision Rule
Intervention (B) Participant 1	Phase A to Phase B	❖ Acquiring 5 data points. ❖ Lowest average of specific feedback.
Baseline (A) Participant's 2 and 3	No transition until Participant 1 transitions to Phase B (Intervention)	❖ Participant's 2 and 3 will continue to remain in baseline. ❖ If participants reach criteria of mastery during baseline, then the participant will no longer be in the study. ❖ Criteria for mastery: o On average 4 specific praise statements per
Maintenance (C) Participant 1	Transition from Phase B to Phase C	❖ Participant provides an average of 4 specific feedback statements per 5 minute interval for 3 consecutive days ❖ SD 2
Intervention (B) Participant 2	Transition from Phase A to Phase B	❖ Participant 1 transitions to Phase (C) Maintenance ❖ Participant 2 will begin Phase B once participant 1 transitions to Phase C
Baseline (A) Participant 3	Continuance of Phase A	❖ Participant continues to demonstrate on average less than 4 specific praise statements per interval that is recorded.

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