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Using Cell Phone Technology For Self-monitoring Procedures In Inclusive Settings

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USING CELL PHONE TECHNOLOGY FOR SELF-MONITORING PROCEDURES IN INCLUSIVE SETTINGS

by

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ABSTRACT

The purpose of this study was to determine the effects and social validity of an innovative method for middle school students with high incidence disabilities to self-monitor their behavior in inclusive settings. Traditional self-monitoring procedures were updated by incorporating cell phone technology. The updated self-monitoring procedure, called CellF-Monitoring, used a cell phone to replace traditional cueing and recording procedures.

The study took place in an inclusive middle school classroom in central Florida with two students with high incidence disabilities. A multiple-baseline-across-participants single subject design was employed. Results indicate that the CellF-Monitoring procedure is an effective and socially valid intervention.

Although results of the study demonstrated the effectiveness of the CellF-Monitoring procedure, there are several limitations that should be discussed, including the number of replications, the sample size, teacher implementation, and use of personal cell phones. The limitations of the study provide several opportunities for future research.

I dedicate this dissertation to my parents, John and Jocelyne Lasiste. I would not have made it

this far without your unconditional love, support, spare bedroom, pet care, vehicle maintenance,

home-cooked meals, and endless provision of Diet Mountain Dew throughout the years. I love

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CHAPTER ONE: INTRODUCTION

Background: Need for the Study

The No Child Left Behind Act (NCLB; 2001) and the Individuals with Disabilities Act (IDEA; 2004) raised expectations for academic achievement for all students. As mandated by NCLB, states are required to (a) develop academic standards that are the same for all students, (b) ensure that all students participate in annual state assessments and make adequate yearly progress (AYP), and (c) ensure that there is a highly qualified teacher in each classroom (Cortiella, 2006; Rosenberg, Sindelar, & Hardman, 2004). An outcome of NCLB is that all students, including those with disabilities, are to achieve higher levels of academic performance if schools developed the highest academic standards, provided a rigorous curriculum, and used scientifically-based instruction. If students do not achieve higher levels of academic performance, schools, districts, and states are held accountable for their students' failure (Hardman & Dawson, 2008; Rosenberg, Sindelar, & Hardman, 2004). However, if students with disabilities are required to participate in the same state and district assessments as their peers without disabilities, they need to have access to the curricula on which the assessments are based (Rosenberg, Sindelar, & Hardman, 2004). This increased focus on access to the general education curriculum translated into a push for inclusion of students with disabilities (Kauffman,

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Bantz, & McCullough, 2002). According to IDEA data, the number of students with disabilities who spent 80% or more of the school day in a general education classroom increased from 2,839,431 in 2001 to 3,191,458 in 2004 (Data Accountability Center, 2009). However, Congress was unsure if changing the educational placement of students with disabilities alone would generate the valued outcomes of employment, independence, and community involvement (Hardman & Dawson, 2008; Rosenberg, Sindelar, & Hardman, 2004). Therefore, the 2004 reauthorization of IDEA is designed to improve the outcomes of students with disabilities by ensuring that (a) students with disabilities have access to, are involved in, and progress in a challenging general education curriculum; and (b) that teachers are made accountable for student learning (Hardman & Dawson, 2008; Rosenberg, Sindelar, & Hardman, 2004).

Although placement in general education classrooms provides students with disabilities access to the same curricula and expectations as their peers without disabilities, many students with disabilities exhibit certain behavioral characteristics that may exacerbate academic deficits and impede their ability to function in a general education classroom (Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999). Students across disability categories commonly demonstrate behaviors such as hyperactivity, inattentiveness, poor social skills, and spend less time on task (Rock, Fessler, & Church, 1997; Truesdell & Abramson, 1992); all of which can be attributed to an inability to self-regulate behavior (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999).

A student's ability to self-regulate his or her own behavior begins with the ability to self-monitor his or her own behavior (Kanfer & Karoly, 1972). According to Polsgrove and Smith (2004), self-monitoring is a critical component in the self-regulation process because it represents a student's commitment to behavioral change. Self-monitoring has been defined as a student's ability to (1) accurately observe their own behavior, (2) recognize the current behavior as inadequate or inappropriate, and (3) identify the problematic behavior or behaviors (Kanfer & Karoly, 1972); and as a two-stage procedure in which a student (1) observes his or her own behavior to determine whether a targeted behavior has occurred and then (2) records the occurrence of the targeted behavior (Nelson & Hayes, 1981). Generally, self-monitoring procedures include three components: (1) a cue provided to the student, (2) the student assessing whether the targeted behavior has occurred, and (3) recording the occurrence or nonoccurrence of the targeted behavior (DiGangi, Maag, & Rutherford, 1991; Glynn & Thomas, 1974; Glynn, Thomas, & Shee, 1973).

Self-monitoring, as an intervention, has shown positive results for students with and without disabilities across educational settings (Anderson & Wheldall, 2004; Ballard & Glynn, 1975; Crum, 2004; Fitzpatrick & Knowlton, 2009; Glynn, Thomas, & Shee, 1973; Gottman & McFall, 1972; Gulchak, 2008; Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; Hallahan, Marshall, & Lloyd, 1981; Harris, Friedlander, Saddler, Frizzelle, & Graham, 1994; Kern & Dunlap, 1994; McDougall & Brady, 1995; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; Ninness, Fuerst, Rutherford, & Glenn, 1991). Benefits of self-monitoring in educational

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settings include increasing students' self-reliance, decreasing students' overreliance on external control agents, and increasing teacher instructional time by decreasing the amount of time spent on behavior management (McDougall, 1998). As such, self-monitoring has been highlighted as an effective intervention to increase students with disabilities' ability to function in general education settings (Dalton, Martella, & Marchand-Martella, 1999; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Prater, Joy, Chilman, Temple, & Miller, 1991; Rooney, Hallahan, & Lloyd, 1984).

Statement of the Problem

Students with disabilities, especially those with high incidence disabilities, often lack the ability to regulate their own behavior making it difficult to function in general education classrooms. Students with high incidence disabilities who are unable to regulate their own behavior typically have a range of issues (Rock, Fessler, & Church, 1997; Truesdell & Abramson, 1992). Research has supported the use of self-monitoring as a strategy to teach students with disabilities to regulate their behavior and potentially "provide a mechanism for generalizing improvements in academic and behavioral performance over settings and across time" (Polsgrove & Smith, 2004, p. 406).

Typically, self-monitoring procedures incorporate paper, pencil, a cassette tape player, and headphones, which may appear primitive and outdated to a generation that is highly mobile and immersed in technology on a daily basis. Students with disabilities often want to fit in with their nondisabled peers and run the risk of standing out if they use such overt and antiquated

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intervention procedures. It is unlikely that students will want to use, or benefit from, the self-monitoring procedures if there is a possibility of any social repercussions resulting from its use. Thus, updated self-monitoring procedures are needed or the proven benefits of self-monitoring on students with high incidence disabilities will be wasted.

Cell phones have the potential to make self-monitoring, an established research-based intervention, more discreet, socially acceptable, and mobile. First, the text messaging function of a cell phone could replace outdated procedures traditionally used for two of the three components of self-monitoring, cueing and recording. Secondly, using a cell phone as the self-monitoring device may also make self-monitoring procedures more socially acceptable to students with high incidence disabilities in inclusive classrooms. Lastly, cell phones could also improve the mobility of self-monitoring procedures for middle school students with high incidence disabilities in general education classrooms as they typically move from class to class throughout the school day.

Although cell phones could be a viable self-monitoring device, no studies were found that explore the use of cell phones to update traditional self-monitoring procedures. As such, the researcher updated the self-monitoring procedure using cell phone technology. The updated self-monitoring procedure, CellF-Monitoring, used text messages to serve as cues to prompt self-assessment and replies to the text message cues to record the occurrence or nonoccurrence of targeted behavior. The text message cues replaced traditional cueing procedures that included a

beeper tape, tape player, and headphones. The replies to the text message cues replaced

traditional recording procedures that included paper and pencil.

Purpose of the Study

The broad purpose of this study was to explore the use of an innovative self-monitoring

procedure on the on-task behavior of students with high incidence disabilities. Specifically, the

study sought to determine (1) the effects of CellF-Monitoring, a self-monitoring procedure that

utilized cell phone technology and (2) the social validity of the CellF-Monitoring procedure.

Research Questions

1. How will CellF-Monitoring, a self-monitoring procedure that utilizes a cell phone for

   cueing and recording, affect the on-task behavior of middle school students with high

   incidence disabilities in inclusive settings?

2. How will middle school general education teachers, middle school special education

   teachers, and middle school students with high incidence disabilities rate the social

   validity of the CellF-Monitoring procedure?

Definition of Terms

Students with High Incidence Disabilities

Students with high incidence disabilities were defined for the purposes of this study as

students with learning disabilities (LD) and students with emotional disturbance (ED) as defined

by the Individuals with Disabilities Education Act (IDEA) of 2004; and students diagnosed with

attention deficit-hyperactivity disorder (ADHD) who are eligible for special education and related services under Section 504 of the Rehabilitation Act of 1973 (Gresham & MacMillan, 1997).

Behavioral Self-Regulation

Behavioral self-regulation refers to a complex process to ultimately achieve self-control (Kanfer & Karoly, 1972; Mahoney & Thoresen, 1972; Polsgrove & Smith, 2004) that includes four stages (Kanfer & Karoly, 1972; Polsgrove & Smith, 2004): (1) Self-Monitoring, Discrepancy Detection, and Commitment to Change; (2) Goal Setting; (3) Strategy Selection and Implementation; and (4) Self-Evaluation and Self-Reinforcement. According to Polsgrove and Smith (2004), an individual is exercising behavioral self-regulation when he or she "acts independently of what one would predict based upon the immediately available external consequences and is more reliant (presumably) on internal controlling responses" (p. 402).

Self-Monitoring

For the purpose of this study, self-monitoring was defined as a procedure that includes three components: (1) a cue provided to the student, (2) the student assessing whether the targeted behavior has occurred, and (3) the student recording the occurrence or nonoccurrence of the targeted behavior.

Text Message

A text message is a message with up to 140 characters that is composed using the keypad of a cell phone. Text messages are sent from the phone on which it was composed directly to another cell phone. Text messaging is not restricted by cell phone service carriers and can be sent to any cell phone.

Social Network

A social network is an association of people drawn together by family, work, interests, or hobbies. Social networking occurs over the internet through a variety of websites and applications that allow users to share content, interact, and develop communities around similar interests.

Twitter

Twitter is a social networking application where friends, family, and co–workers can communicate with the exchange of quick, frequent messages of 140 characters or less, called tweets (www.twitter.com).

HootSuite

HootSuite is a Professional Social Media Dashboard where individuals and companies can manage multiple social networking profiles and track followers (www.hootsuite.com).

CellF-Monitoring

CellF-Monitoring is an updated self-monitoring procedure that incorporates the use of cell phones as the self-monitoring device. The CellF-Monitoring procedure utilized a cell phone to replace the cueing and recording procedures used in traditional self-monitoring procedures. In CellF-Monitoring, cues are sent as text messages to prompt self-assessment and recording is done by replying to the text message cue indicating the occurrence or nonoccurrence of the target behavior.

Research Design

Single-subject research was employed for the purposes of this study. Single-subject research is (a) practical for evaluating behavioral interventions, (b) practical for evaluating behavioral interventions in typical classroom settings, and (c) cost-effective (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). A multiple-baseline-across-participants design was employed to determine the effects of CellF-Monitoring on the on-task behavior of students with high incidence disabilities in inclusive settings. A multiple-baseline-across-participants design was chosen for the purposes of this study to demonstrate the effects of the intervention as an alternative to a reversal design to alleviate ethical concerns about withdrawing an effective intervention or that learned behavior cannot be unlearned (Baer, Wolf, & Risley, 1968; Kazdin, 1982; Tankersley, Harijusola-Webb, & Landrum, 2008; Tawney & Gast, 1984). Additionally, a researcher-developed questionnaire was used to determine the practicality of the CellF-Monitoring procedures.

Limitations of the Study

There are several limitations to the study. Only two students participated in the study. The small sample size limits generalization and external validity. A second limitation of the current study is that the classroom teacher was not involved in the training or implementation of the intervention. Finally, the student participants used cell phones that were provided by the researcher instead of using their personal cell phones.

Summary

This research study was grounded on literature on behavioral self-regulation deficits typically demonstrated by students with high incidence disabilities (Harris, Friedlander, Saddler, Frizzelle, & Graham, 1994; Mayer, Lochman, & Van Acker, 2005; Polsgrove & Smith, 2004; Robinson, Smith, Miller, & Brownell, 1999; Rock, Fessler, & Church, 1997), reports of the positive effects of self-monitoring as the first step for students with high incidence disabilities to regulate their behavior across settings (Anderson & Wheldall, 2004; Crum, 2004; Fitzpatrick & Knowlton, 2009; Gulchak, 2008; Harris, Friedlander, Saddler, Frizzelle, & Graham, 1994; Kern & Dunlap, 1994; McDougall & Brady, 1995; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; Polsgrove & Smith, 2004; Ninness, Fuerst, Rutherford, & Glenn, 1991), and the need to make self-monitoring procedures more conducive to and socially acceptable in inclusive settings. The following chapter provides a review of the literature pertaining to the use of self-monitoring with students with high incidence disabilities in educational settings.

CHAPTER TWO: LITERATURE REVIEW

Introduction

The purpose of this chapter is to provide a review of the literature pertinent to the research study. The chapter begins with a brief historical overview of self-monitoring followed by a brief description of traditional self-monitoring procedures in clinical and educational settings. Next, the author presents evidence to support the use of self-monitoring as an intervention for students with high incidence disabilities. Finally, the author closes the chapter by providing supporting evidence for the use of cell phone technology to enhance and make self-monitoring procedures more practical for students with disabilities in inclusive settings.

Self-Monitoring

Self-monitoring is a component of a complex four-stage self-regulation process to ultimately achieve behavioral self-control (Kanfer & Karoly, 1972; see Polsgrove & Smith, 2004 for discussion). The first stage, self-monitoring, involves accurately observing one's own behavior, recognizing current behavior as inadequate or inappropriate, and identifying the behavior that is problematic. The second stage, goal-setting, comprises recognizing behavior that is required in the current situation. The third stage, strategy selection and implementation, includes selecting and implementing a set of strategies to effectively regulate behavior. The

fourth stage, self-evaluation and self-reinforcement, concerns objectively evaluating performance and altering for the current situation. Self-monitoring is a critical component in the self-regulation process because, as the first stage, it represents the student's commitment to behavioral change (Polsgrove & Smith, 2004). Self-monitoring is a procedure that entails two stages in which an individual (1) observes his or her own behavior to determine if a targeted behavior has occurred and (2) records the occurrence of the observed behavior (Nelson & Hayes, 1981). Generally, self-monitoring procedures include three components: (1) a cue provided to the student, (2) the student assessing whether the targeted behavior has occurred, and (3) recording the occurrence or nonoccurrence of the targeted behavior (DiGangi, Maag, & Rutherford, 1991; Glynn & Thomas, 1974; Glynn, Thomas, & Shee, 1973).Self-monitoring has been used successfully in clinical (Korotitsch & Nelson-Gray, 1999) and educational settings (McDougall, 1998; McLaughlin, 1976; O'Leary & Dubey, 1979; Reid, 1996; Rosenbaum & Drabman, 1979).

<div align="center">Reactivity of Self-Monitoring</div>

The effectiveness of self-monitoring to increase desired behaviors is attributed to its reactive effects on targeted behaviors (Anderson & Wheldall, 2004; Broden, Hall, & Mitts, 1971; Cavalier, Ferretti, & Hodges, 1997; DiGangi, Maag, & Rutherford, 1991; Gottman & McFall, 1972; Hayes & Nelson, 1983; Kirby, Fowler, & Baer, 1991; Korotitsch & Nelson-Gray, 1999; Lipinski, Black, Nelson, & Ciminero, 1975; McLaughlin, 1976; Nelson & Hayes, 1981; Snider, 1983). Reactivity is defined as the effect that self-monitoring has on the frequency of targeted

behavior as a function of the self-monitoring procedure (Kanfer, 1970; Nelson & Hayes, 1981; Rachlin, 1974). In other words, the act of one self-monitoring his or her behavior influences the frequency of the monitored behavior.

Three theories are often used to explain the reactivity of self-monitoring (Anderson & Wheldall, 2004; Korotitsch & Nelson-Gray, 1999; Nelson & Hayes, 1981; Snider, 1987). The first theory explaining the reactivity of self-monitoring is the cognitive-behavioral theory. The cognitive-behavioral model includes an internal self-evaluative process in which covert self-statements are seen as the overt behavior change agents (Kanfer, 1970; Korotitsch & Nelson-Gray; 1999; Nelson & Hayes, 1981; Snider, 1987). The second theory explaining the reactivity of self-monitoring is the operant model. According to the operant theory of reactivity, self-monitoring serves as a cue to environmental consequences and the consequences are the behavior change agents (Korotitsch & Nelson-Gray, 1999; Nelson & Hayes, 1981; Rachlin, 1974; Snider, 1987). The third, and final, theory explaining the reactive effects of self-monitoring is Nelson and Hayes' (1981) extension of the operant theory of reactivity. Nelson and Hayes assert that the entire self-monitoring procedure affects the reactivity of self-monitoring. The self-monitoring procedures, including the devices, function in a manner similar to external cues in changing behavior. For example, reactive effects could be produced even when self-recording is inaccurate or when self-monitored behavior is at a low rate because the self-recording device itself produces the reactive effects.

Several researchers have conducted studies to gain a better understanding of the reactive effects of self-monitoring. For instance, Lipinski, Black, Nelson, and Ciminero (1975) investigated variables that could enhance the functions of self-monitoring by differentially reinforcing the reactive effects of self-monitoring or the accuracy of recording. Participants were 20 postsecondary students who displayed high frequencies of face-touching who were nested in the two treatment groups. The results indicated that the self-monitoring procedures produced reactive effects without accuracy of recording. Participants who were reinforced for accuracy of recording increased their accuracy but did not decrease the frequency of the targeted behavior. However, participants who were reinforced for decreasing the frequency of the targeted behavior demonstrated a decrease in the behavior without increasing their recording accuracy. The researchers' findings support Nelson and Hayes' (1981) later theory that the procedure and devices used to self-monitor can positively influence behavior regardless of recording accuracy.

Hayes and Nelson (1983) evaluated the functional equivalence of self-monitoring and external cues on the frequency of face-touching with sixty postsecondary students. Baseline data were collected on the frequency of face-touching for all participants followed by random assignment of each participant to one of four groups: (1) control, (2) self-monitoring, (3) contingent external cuing, or (4) noncontingent external cuing group. The control group was only asked to watch a movie on autism while participants in the self-monitoring group were asked to watch the movie and touch a telegraph key each time they touched their face. The contingent external cuing group was asked to watch the movie and tough a telegraph key each

time the message "don't touch your face" flashed on the screen. The participants did not know that the observer would flash the message each time the participant touched her face. The last group, noncontingent external cuing group, was asked to watch the message and touch the telegraph key each time the message "don't touch your face" flashed on the screen, which was based on a fixed interval. Results indicated that the external cuing (contingent and noncontingent) produced reactive effects indistinguishable from self-monitoring supporting Nelson and Hayes' theory that self-monitoring procedures function in a manner similar to external cues.

Self-Monitoring in Clinical Settings

Self-monitoring has a substantial history in the research literature as an assessment tool in clinical practice (Korotitsch & Nelson-Gray, 1999). The role of self-monitoring for assessing behavior is of great import to behavior therapists within clinical assessment (Anderson & Wheldall, 2004; Korotitsch & Nelson-Gray, 1999; Nelson & Hayes, 1981) because 'accurate assessment of responses and their controlling variables is a cornerstone of behavior therapy' (Korotitsch & Nelson-Gray, 1999, p. 415). Elliot, Miltenberger, Kaster-Bundgaard, & Lumley (1996) reported on a survey indicating that 83% of practitioners in the field of behavior therapy reported using self-monitoring procedures with 44% of their clients (as cited in Korotitsch & Nelson-Gray, 1999, p. 415). According to Korotitsch and Nelson-Gray (1999), the use of self-monitoring as an assessment tool is perpetuated for several reasons. To begin with, self-monitoring requires minimal clinical resources and, therefore, provides an inexpensive

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alternative for data collection. Also, self-monitoring allows clients to collect data on behaviors, such as covert or personal behaviors that preclude the use of direct observation. Finally, self-monitoring can be used in all stages of assessment, including diagnosis and treatment selection; and conducting a functional assessment and evaluating treatment outcomes. As the use of self-monitoring as an assessment tool increased, clinicians realized that self-monitoring caused reactive changes in behavior that may be beneficial in educational settings (Reid, 1996).

<div align="center">Self-Monitoring in Educational Settings</div>

As self-monitoring continued to show positive effects in changing behavior in clinical settings, educational researchers began to consider the potential benefits of self-monitoring in educational settings (McDougall, 1998; McLaughlin, 1976; O'Leary & Dubey, 1979; Reid, 1996; Rosenbaum & Drabman, 1979). Two seminal studies conducted by Broden, Hall, and Mitts (1971) explored the reactivity of self-recording on two students in general education settings. The first study examined the impact of self-recording on study behaviors and the second study assessed the impact of self-recording on the occurrences of talk-outs. The participant in the first study increased desired study behavior from 30% to 78%. Additionally, when the self-recording sheets were withheld from the participant, study behavior dropped to an average of 27% and then increased again to an average of 80% when the recording sheets were reinstated. Results for the second study were not as favorable showing only an initial decrease in undesired talk-outs. Although the results of the two studies are mixed, they both support several theories reported in the researcher literature. First, the participant's decrease of desired behavior

when the recording sheets were withdrawn and subsequent increase when they were reinstated supports Nelson and Hayes' (1981) assertion that the recording device itself is enough to produce changes in behavior. Second, the brief decrease of the participant's undesired behavior and sustained increase of the participant's desired behavior support the theory that the valence, or directionality, of the behavior influences the effects of self-monitoring (Reid, 1996). Self-monitoring has shown to be more effective when attempting to increase a positive, or desired, behavior as opposed decreasing a negative, or undesirable, behavior (Gottman & McFall, 1972; Korotitsch & Nelson-Gray, 1999). Third, the participant in the first study was motivated to increase desired behavior whereas the participant in the second study did not express any motivation to decrease undesired behavior, which supports the theory that motivation is an essential component of self-monitoring. Prior research has indicated that the effectiveness of self-monitoring is predicated on the individual's motivation and commitment to behavior change (Anderson & Wheldall, 2004; Kanfer & Karoly, 1972; Korotitsch & Nelson-Gray, 1999; Lipinski, Black, Nelson, & Ciminero, 1975; O'Leary & Dubey, 1979; Polsgrove & Smith, 2004). Overall, the results established that self-monitoring could be used as a stand-alone intervention for promoting positive changes in behavior warranting further research of self-monitoring in educational settings. Subsequent studies broadened the self-monitoring research by demonstrating that self-monitoring has produced positive effects on academic performance (Ballard & Glynn, 1975; Bahr, Fuchs, Fuchs, Fernstrom & Stecker, 1993; Wood, Murdock, Cronin, Dawson, & Kirby, 1998), on-task behavior (Ballard & Glynn, 1975; Glynn & Thomas,

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1974; Glynn, Thomas, & Shee, 1973; Wood, Murdock, & Cronin, 2002; Wood, Murdock, Cronin, Dawson, & Kirby, 1998), classroom behavior and social skills (Peterson, Young, West, & Peterson, 1999), and generalizing treatment gains across settings (Peterson, Young, West, & Peterson, 1999; Wood, Murdock, & Cronin, 2002).

<u>Self-Monitoring and Students with High Incidence Disabilities</u>

Extensive research has also been conducted on the use of self-monitoring procedures as an intervention for students with high incidence disabilities (Anderson & Wheldall, 2004; McDougall, 1998; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; Reid, 1996; Snider, 1987). Findings support the use of self-monitoring to increase desirable behaviors of students with high incidence disabilities (Anderson & Wheldall, 2004; McDougall, 1998; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; Reid, 1996; Snider, 1987). As illustrated in Table 1, there is evidence to suggest that the effectiveness of self-monitoring is not determined by students' disability category, grade level, or educational setting. For example, eight studies focused on students with learning disabilities (Cavalier, Ferretti, & Hodges, 1997; Dalton, Martella, & Marchand-Martella, 1999; DiGangi, Maag, & Rutherford, 1991; Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; Hallahan, Marshall, & Lloyd, 1981; Lloyd, Hallahan, Kosiewicz, & Kneedler, 1982; Rooney, Hallahan, & Lloyd, 1984; Wolfe, Heron, & Goddard, 2000), six on students with emotional disturbance (Crum, 2004; Dunlap, Clarke, Jackson, Wright, Ramos, & Brinson, 1995; Kern & Dunlap, 1994; Gulchak, 2008; McDougall & Brady, 1995; Ninness, Fuerst, Rutherford, & Glenn, 1991), one on students with attention deficit-hyperactivity disorder (Harris,

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Friedlander, Saddler, Frizzelle, & Graham, 2005), and six studies that included participants from more than one disability category or participants with multiple disabilities (Mathes & Bender, 1997; Prater, Joy, Chilman, Temple, & Miller, 1991; Rock, 2005; Shapiro, DuPaul, & Bradly-Klug, 1998; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999; Smith & Young, 1992). Additionally, 14 studies focused on students in elementary school (Crum, 2004; DiGangi, Maag, & Rutherford, 1991; Dunlap, Clarke, Jackson, Wright, Ramos, & Brinson, 1995; Kern & Dunlap, 1994; Gulchak, 2008; Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; Hallahan, Marshall, & Lloyd, 1981; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Lloyd, Hallahan, Kosiewicz, & Kneedler, 1982; Mathes & Bender, 1997; McDougall & Brady, 1995; Rock, 2005; Rooney, Hallahan, Lloyd, 1984; Wolfe, Heron, & Goddard, 2000), five in middle school (Cavalier, Ferretti, & Hodges, 1997; Dalton, Martella, & Marchand-Martella, 1999; Ninness, Fuerst, Rutherford, & Glenn, 1991; Shapiro, DuPaul, & Bradley-Klug, 1998; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999), and two in high school (Prater, Joy, Chilman, Temple, & Miller, 1991; Smith & Young, 1992;). Eleven of the studies were conducted in self-contained settings (Cavalier, Ferretti, & Hodges, 1997; Dunlap, Clarke, Jackson, Wright, Ramos, & Brinson, 1995; Kern & Dunlap, 1994; Gulchak, 2008; Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; Hallahan, Marshall, & Lloyd, 1981; Lloyd, Hallahan, Kosiewicz, & Kneedler, 1982; McDougall & Brady, 1995; Ninness, Fuerst, Rutherford, & Glenn, 1991; Shapiro, DuPaul, & Bradley-Klug, 1998; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999), two in resource room settings (Mathes & Bender, 1997; Wolfe,

Heron, & Goddard, 2000), six in general education settings (Crum, 2004; Dalton, Martella, & Marchand-Martella, 1999; DiGangi, Maag, & Rutherford, 1991; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Rock, 2005; Rooney, Hallahan, & Lloyd, 1984), and three in multiple settings (Prater, Joy, Chilman, Temple, & Miller, 1991; Shapiro, DuPaul, & Bradley-Klug, 1998; Smith & Young, 1992). Not only has self-monitoring produced positive effects across disability categories, grade levels, and educational it has also produced positive effects across behaviors that are typically problematic for students with high incidence disabilities (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999).

The effectiveness of self-monitoring on academic performance and accuracy has been examined in special education settings (Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; McDougall & Brady, 1995) and general education settings (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005). Academic behavior has been defined in terms of the rate of academic responses (Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979), total number of words written correctly (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005), the percent of words spelled correctly (McDougall & Brady, 1995), the total number of math problems completed and the total number of math problems that were correct (Rock, 2005), the percent of seat work correct and the percent of seat work complete (Smith & Young, 1992). Many researchers have attributed increases in desired academic behavior to self-monitoring procedures (Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; Harris, Friedlander, Saddler, Frizzelle,

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& Graham, 2005; McDougall & Brady, 1995; Smith & Young, 1992). However, results from studies conducted by Rock (2005) and Wolfe, Heron, and Goddard (2000) were not consistent with previous findings. Rock (2005) evaluated the effectiveness of a self-monitoring intervention on students with different academic and behavioral needs in a general education classroom. Rock found that the self-monitoring intervention effectively increased the total number of math problems completed but not the number of math problems that were correct. Wolfe, Heron, and Goddard (2000) concluded that the effects of self-monitoring on the academic performance of students with LD in a special education resource classroom were not significant enough to declare a functional relationship.

In addition to increasing desired academic behaviors, researchers within the field of special education suggest that self-monitoring influences disruptive behavior, socially inappropriate behavior, and problem behavior in positive directions (Cavalier, Ferretti, & Hodges, 1997; Dunlap, Clarke, Jackson, Wright, Ramos, & Brinson, 1995; Kern & Dunlap, 1994; Ninness, Fuerst, Rutherford, & Glenn, 1991; Rock, 2005). Studies have indicated that self-monitoring effectively decreases disruptive and socially inappropriate behavior in special education settings (Cavalier, Ferretti, & Hodges, 1997; Dunlap et al., 1995; Kern & Dunlap, 1994; Ninness, Fuerst, Rutherford, & Glenn, 1991); and problem behavior in general education settings (Rock, 2005). Though findings from such studies do not support the theory that self-monitoring is more effective in increasing a behavior with a positive valence, or desirable

behavior, than it is in decreasing a behavior with a negative valence, or undesirable behavior (Gottman & McFall, 1972; Korotitsch & Nelson-Gray, 1999; Reid, 1996).

On-Task and Off-Task Behavior

On-task behavior is the most frequently assessed dependent variable in self-monitoring studies involving students with high incidence disabilities across settings (Anderson & Wheldall, 2004; Reid, 1996). As outlined in Table 1, self-monitoring effectively increases the on-task behavior of students across disability categories and grade levels in special and general education settings. Self-monitoring has effectively increased levels of on-task behavior for elementary and secondary students with high incidence disabilities in special education settings (Dunlap, Clarke, Jackson, Wright, Ramos, & Brinson, 1995; Kern & Dunlap, 1994; Gulchak, 2008; Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; Hallahan, Marshall, & Lloyd, 1981; Mathes & Bender, 1997; McDougall & Brady, 1995; Prater, Joy, Chilman, Temple, & Miller, 1991; Shapiro, DuPaul, & Bradley-Klug, 1998; Wolfe, Heron, & Goddard, 2000) and general education settings (Crum, 2004; DiGangi, Maag, & Rutherford, 1991; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Rock, 2005; Rooney, Hallahan, & Lloyd, 1984).

In addition to producing positive effects on on-task behavior in special education settings and general education settings, self-monitoring has increased levels of on-task behavior across multiple special education settings (Prater, Joy, Chilman, Temple, & Miller, 1991; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999) and mutlitple general education settings (Prater, Joy, Chilman, Temple, & Miller, 1991). For instance, self-monitoring increased the on-task behavior

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of a high school student with a comorbid diagnosis of emotional disturbance and a learning disability in resource government and English classes (Prater, Joy, Chilman, Temple, & Miller, 1991). Similar results were reported by Shimabukuro, Prater, Jenkins, and Edelen-Smith (1999) who evaluated the effects of self-monitoring on the on-task behavior of middle school students with comorbid diagnoses of learning disabilities and attention deficit-hyperactivity disorder. Data indicate that the levels of on-task behavior increased for all participants across three content areas in a single self-contained classroom. However, results from a study conducted across two general education settings (Prater, Joy, Chilman, Temple, & Miller, 1991) were not as favorable. Prater, Joy, Chilman, Temple, and Miller (1991) examined the effects of self-monitoring on the on-task behavior of a middle school student with a learning disability across general education study hall and social studies classes. During baseline, the participant's on-task mean for study hall was 50% and 66% for social studies. The participant's on-task mean increased to 89% in study hall but decreased to 59% in social studies during the intervention phase. The researchers attributed the decrease of the participant's on-task behavior from the baseline to intervention phase in social studies on an inadequately defined target behavior. The researchers claimed that it was difficult to establish a definition for on-task behavior that was appropriate for the setting and nature of the content area.

Researchers have also evaluated the generalizability of treatment gains produced by self-monitoring but have not reported the same positive results found in previous research. For example, Ninness, Fuerst, Rutherford, and Glenn (1991) found that treatment gains produced by

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self-monitoring procedures did not transfer outside of the training setting. Middle school students with emotional disturbances were taught to self-monitor their off-task and socially inappropriate behavior in a self-contained classroom. Direct observation revealed a decrease in levels of off-task and socially inappropriate behavior in the self-contained setting. Treatment gains made in the training setting did not transfer outside of the treatment setting. The researchers reported that although off-task and socially inappropriate behavior did not transfer outside of the treatment setting, they continued to decrease in the treatment setting. The following year, Smith and Young (1992) found similar results when they examined the generalizability of treatment gains from the training setting to a general education classroom. Their study involved eight high school students with either a learning disability or an emotional disturbance who shared one general education English class. Data revealed that although participants' off-task behavior decreased in the training setting (special education classroom), treatment gains did not generalize to the general education English classroom.

Table 1. Self-Monitoring Studies in Special and General Education Settings

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
Cavalier, Ferretti, & Hodges, 1997	Evaluate effects SR with reinforcement	LD	Middle School	Self-Contained	Inappropriate vocalizations	Decreased
					Accuracy of recording	Low levels of recording accuracy
Crum, 2004	Determine the efficiency of SM.	ED	Elementary School	General Education	On-task behavior	Increased
Dalton, Martella, & Marchand-Martella, 1999	Determine the effects of a self-management program.	LD	Middle School	General Education	Off-task behavior	Decreased off-task behavior with little teacher involvement
					Teacher ratings of student behavior	Teachers reported decrease in off-task behavior and increase in academic performance and productivity

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
DiGangi, Maag, & Rutherford, 1991	Investigate the effects of self-graphing on improving the reactivity of SM procedures.	LD	Elementary School	General Education	On-task behavior	Increased
					Academic performance	Increased
Dunlap, Clarke, Jackson, Wright, Ramos, & Brinson, 1995	Analyze the effects of a SM package.	ED	Elementary School	Self-Contained	Task engagement	Improved task engagement that remained consistently high
					Disruptive behavior	Substantial decrease
Kern & Dunlap, 1994	Assess the effects of SM	ED	Elementary School	Self-Contained	On-task behavior	Increased
					Disruptive behavior	Decreased

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
Gulchak, 2008	Examine SM on-task behavior using mobile handheld computers.	ED	Elementary School	Self-Contained	On-task behavior	Increased
Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979	Investigate the effects of SM independent of backup reinforcement.	LD	Elementary School	Self-Contained	On-task behavior	Increased
					Academic productivity	Increased
Hallahan, Marshall, & Lloyd, 1981	Investigate the effects of SM	LD	Elementary School	Self-Contained	Percent of time on task	Increased
					Recording accuracy	Accuracy of self-recording may affect success of the treatment

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005	Examine the differential effectiveness of SMA versus SMP.	ADHD	Elementary School	General Education	On-task behavior	Increased on-task behavior and stability of on-task behavior with little difference between the two monitoring procedures
					Academic performance	Both monitoring procedures increased academic performance with SMA procedures resulting in higher levels of academic accuracy
Lloyd, Hallahan, Kosiewicz, & Kneedler, 1982	Compare the reactive effects of self-assessment and self-recording.	LD	Elementary School	Self-Contained	On-task behavior	Self-recording produced more beneficial reactive effects than self-assessment

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Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
					Academic productivity	Inconclusive
Mathes & Bender, 1997	Investigate the efficacy of SM coupled with a pharmacological treatment plan in classroom settings.	LD ED ADHD	Elementary School	Resource	On-task behavior	Increased and maintained throughout fading phases
					Social validity	Goal, procedures, and effects were rated as socially valid by teacher and participants
McDougall & Brady, 1995	Evaluate participants' performance using self-assessment and self-recording.	ED	Elementary School	Self-Contained summer school	Time on task	Increased
					Academic performance	Increased
					SM accuracy	Minimum level of accuracy may be required for beneficial effects
Ninness, Fuerst, & Rutherford, & Glenn, 1991	Assess a method of inducing transfer of self-	ED	Middle School	Self-Contained	Off-task behavior	Prosocial behavior of students with

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
	managing behavior.				Socially inappropriate behavior	ED successfully transferred from the training setting
Prater, Joy, Chilman, Temple, & Miller, 1991	Demonstrate the effectiveness and generalizability of SM procedures.	LD	High School	Resource	On-task behavior	Results support the adaptability and generalizability of SM
		LD	High School	Self-Contained		
		LD	High School	Resource		
		LD	Middle School	Two general education classes		
		ED/LD	High School	Two special education classes		
Rock, 2005	Evaluate the effectiveness of a combined SMA and SMP self-monitoring intervention on students with different academic and behavioral needs; and	Asperger syndrome Gifted Floating Harbor syndrome LD/ADHD. LD ADHD Nondisabled	Elementary School	General education	Academic engagement and disengagement	Increased
					Academic disengagement and non-targeted problem behavior	Decreased
					Academic productivity	Increased

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
	applicability across various stages of content acquisition.				Academic accuracy	Did not increase
Rooney, Hallahan, & Lloyd, 1984	Investigate SM with reinforcement on a large group.	LD	Elementary School	General education	On-task behavior	Increased
Shapiro, DuPaul, & Bradley-Klug, 1998	Evaluate the effects of SM.	ADHD/LD	Middle School	Self-contained	On-task behavior	Increased
		ADHD		Resource		
Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999	Investigate the effects of SM.	LD/ADHD	Middle School	Self-contained	On-task behavior	Increased
					Academic accuracy	Increased
					Academic productivity	Increased

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
					Social Validity	Teacher reported intervention was easy to implement, appropriate for the targeted behaviors, and relevant to students' needs
Smith & Young, 1992	Examine the effects of a self-management procedure that includes peer-evaluation and goal-setting.	LD ED	High School	Resource General education	Off-task behavior	Decreased but did not generalize from training setting to general setting
					Academic behavior	Increased but did not generalize
Wolfe, Heron, & Goddard, 2000	Examine the effects of SM.	LD	Elementary School	Resource	On-task behavior	Increased
					Academic performance	Inconclusive

Study	Research Question	Disability Category of Participants	Grade Level	Setting	Dependent Variable	Results
					Social Validity	General consensus from teachers and participants that using SM was a positive experience

Note. SM = self-monitoring. SMA = self-monitoring attention. SMP = self-monitoring performance.
LD = learning disability. ED = emotional disturbance. ADHD = attention deficit-hyperactivity disorder.

Social Validity

According to social validity data, self-monitoring procedures are effective, age appropriate and practical for classroom implementation (Mathes & Bender, 1997; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999). Students have expressed overall satisfaction with self-monitoring procedures and effects (Mathes & Bender, 1997, Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999). Specifically, teachers have noted improvements in students' target behavior (Mathes & Bender, 1997), and reported that self-monitoring procedures are easy to implement, and are relevant to students' needs (Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999; Wolfe, Heron, & Goddard, 2000).

Self-Monitoring and Technology

Self-monitoring has been highlighted as an effective intervention for students with high incidence disabilities in special and general education settings (Anderson & Wheldall, 2004; Crum, 2004; Fitzpatrick & Knowlton, 2009; Gulchak, 2008; Kern & Dunlap, 1994; McDougall & Brady, 1995; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; Ninness, Fuerst, Rutherford, & Glenn, 1991). Based on prior research (Gulchak, 2008) and from recent reviews of self-monitoring literature (Anderson & Wheldall, 2004; Fitzpatrick & Knowlton, 2009), self-monitoring procedures and devices have remained primitive. For example, Anderson and Wheldall (2004) pointed out that a majority of prior research used tape-recorded audio tones to deliver cues for students to initiate self-monitoring. The tape recorders were either placed on or near the student's desk. Additionally, students often used headphones to hear the audio tones

without distracting others in the classroom. Participants have found such cueing procedures embarrassing and annoying (Harris, Graham, Reid, McElroy, & Hamby, 1994). Although cueing procedures have advanced somewhat (e.g., vibrating beeper, vibrating watch), only one study using technology has been conducted to date (Gulchak, 2008). Gulchak (2008) conducted a study to examine self-monitoring on-task behavior using a mobile handheld computer for an elementary student with ED. A Palm Zire 72 handheld computer was used as the self-monitoring device. Software was purchased and installed onto the device that allowed the researcher to create a self-monitoring form. The alarm on the calendar application of the device was scheduled to chime at 10-minute intervals at which point the student recorded the occurrence or nonoccurrence of the target behavior directly on the handheld computer using the researcher-created self-monitoring form. Data revealed that the student was able to self-monitor on-task behavior using a mobile handheld computer and that the self-monitoring procedures effectively increased the student's on-task behavior. The researcher also noted that the teacher was able to teach the student the self-monitoring procedures using the handheld computer, the student expressed excitement about using the handheld computer, and the handheld computer was less stigmatizing and obtrusive than traditional recording materials.

Gulchak's findings demonstrate that technology is capable of propelling self-monitoring into the technology age by making self-monitoring procedures discreet, mobile, and increase the overall social validity of self-monitoring (Gulchak, 2008). As such, using technological device that is socially acceptable and has the functionality for serving as a self-monitoring device may

be the most practical way to update self-monitoring procedures. A cell phone is one such device that meets both criteria. First, cell phones are socially acceptable. The prevalence of cell phones among those who are school-aged is indisputable. According to the Pew Internet & American Life Project (2009), 71% of teens 12 to 17 years old owned a cell phone while only 60% of those owned a desktop or laptop computer. The Project further revealed that the largest increase in cell phone ownership occurred during the transition between middle and high school. Over half of the 12 to 13 year olds surveyed owned a cell phone and rose to 84% by the age of 17. Second, cell phones have the functionality to serve as self-monitoring devices. For example, the vibrating text message alert can be used to remind a student to assess his or her behavior instead of an audio tone while responding to the text message is the equivalent to paper and pencil recording. As such, replacing tape recorders and paper and pencil with cell phones for self-monitoring procedures has the potential to strengthen the practicality and social validity of self-monitoring procedures across settings.

<center>Summary</center>

This research study was grounded on the increasing number of students with high incidence disabilities being placed in inclusive settings and the range of behaviors typically exhibited by such students that hinder their ability to function in inclusive settings. The researcher sought to determine if an updated self-monitoring procedure that used cell phone technology would produce positive effects consistent with those reported throughout the research literature (Anderson & Wheldall, 2004; Crum, 2004; Fitzpatrick & Knowlton, 2009; Gulchak,

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2008; Kern & Dunlap, 1994; McDougall & Brady, 1995; Mooney, Ryan, Uhing, Reid, &

Epstein, 2005; Ninness, Fuerst, Rutherford, & Glenn, 1991) while maintaining the social validity

of traditional self-monitoring procedures.

CHAPTER THREE: METHODOLOGY

Introduction

The purpose of this chapter is to present the method that was employed to conduct the study. First, the chapter opens with the purpose of the study followed by the research questions. Next, the participants and settings are discussed followed by a thorough explanation of the research design. Finally, the chapter closes with a description of the study procedures and data analyses.

Purpose of the Study

Prior research has demonstrated positive effects of self-monitoring on targeted behavior of students with and without disabilities (Crum, 2004; Fitzpatrick & Knowlton, 2009; Glynn & Thomas, 1974; Gulchak, 2008; Kern & Dunlap, 1994; McDougall & Brady, 1995; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; Ninness & Fuerst, 1995; Ninness, Fuerst, Rutherford, & Glenn, 1991; Rock, 2005; Santogrossi, O'Leary, Romanczyk, & Kaufman, 1973; Wood, Murdock, Cronin, Dawson, & Kirby, 1998). A review of the literature conducted by Anderson and Wheldall (2004) revealed that self-monitoring improves student behavior and increases independence by decreasing reliance on externally administered reinforcement. Self-monitoring is a proactive intervention that can be individualized and implemented across settings (Anderson

& Wheldall, 2004). However, procedures and devices used to self-monitor have not kept up with emerging technology (Fitzpatrick & Knowlton, 2009; Gulchak, 2008). For example, traditional cueing procedures utilize tape-recorded audio tones that require either a tape recorder placed on or near the student's desk and headphones so the student can hear the audio tones without distracting other students. Participants have found that such cueing procedures are embarrassing and annoying (Harris, Graham, Reid, McElroy, & Hamby, 1994). Additionally, recording procedures rarely deviate from paper and pencil recording. Only one study conducted by Gulchak (2008) utilized technology, specifically personal digital devices (PDAs), for students with emotional disturbance to record their monitored behavior. Although self-monitoring procedures have advanced somewhat with the introduction of vibrating beepers and watches for cueing and PDAs for recording; a study has not been conducted that utilizes cell phone technology concurrently for the cueing and recording components of self-monitoring. A self-monitoring procedure that uses cell phone technology has the potential to make the research-based intervention more conducive to inclusive settings by being mobile and more discreet than procedures traditionally used to self-monitor. Therefore, the purpose of the research study was to extend the research literature by, first, determining the effects of CellF-Monitoring, a self-monitoring procedure that utilized cell phone technology for cueing and recording, on the on-task behavior of students with high incidence disabilities in inclusive settings; and second, determining the social validity of the CellF-Monitoring procedure in inclusive settings.

1. How will CellF-Monitoring, a self-monitoring procedure that utilizes cell phone technology for cueing and recording affect the on-task behavior of middle school students with high incidence disabilities in inclusive settings?

2. How will middle school general education teachers, middle school special education teachers, and middle school students with high incidence disabilities rate the social validity of the CellF-Monitoring procedure?

Ethical Considerations

Prior to conducting the study, the researcher sought and obtained approval by the Institutional Review Board to conduct human subject research through the university's Office of Research (see APPENDIX A INSTITUTIONAL REVIEW BOARD LETTER OF APPROVAL). Next, a request to conduct research in a public school was submitted for district approval. Once permission was granted by the district to proceed with the study, recruitment procedures were initiated.

Participants

Student participants were defined as students (a) with a high incidence disability (e.g., learning disability, emotional disturbance) as defined by the state of Florida or medically diagnosed with attention deficit-hyperactivity disorder and served under the Individuals with Disabilities Education Act (2004) as determined by the state of Florida; (b) who are included in at least one core general education class; (c) who are teacher-identified as exhibiting off-task

behavior at a frequency that impedes academic progress; (d) who have an attendance rate of 90% or higher, (e) who return the consent form signed by a parent/guardian; and (f) who assent to participation in the research study. General education teacher participants were defined as (a) the general education teacher of record for a core general education class in which students who met student participant eligibility requirements were enrolled and (b) who consented to participate in the research study. Special education teacher participants were defined as (a) the special education teacher who provided special education services to students who met student participant eligibility requirements and (b) consented to participate in the research study.

The researcher began the recruitment process by obtaining administrative support from a middle school from the local school district. The researcher gave a brief presentation and passed out flyers about the research study to local school administrators attending a school-university partnership meeting. Local school administrators who had pre-existing relationships with the university attended the partnership meeting. The presentation yielded one principal and one special education specialist from different middle schools who expressed an interest in the research study. The researcher met with the principal and specialist individually to discuss specific procedures of the research study. The principal from the first middle school was supportive of the research study and gave permission to proceed with the study on his campus if the device could be changed from a cell phone to an IPod. His middle school had instituted and strictly enforced a no-cell phone policy since the beginning of the school year and felt that allowing the researcher to conduct the study would compromise enforcement of the policy. The

researcher explained that the cell phone was the focal point of the study and could not be changed. As such, the principal did not give the researcher permission to proceed with the research study at his middle school. The special education specialist from the second middle school met with the school principal to present the research study, which resulted in the principal granting permission to conduct the study at his middle school.

After obtaining permission and support from the middle school principal, the researcher recruited teacher and student participants by meeting with the special education specialist to identify teachers who were eligible to participate in the research study. An informational meeting was scheduled for all eligible teachers to provide an overview of the research study and schedule individual follow-up meetings with those interested in participating in the study. One meeting was scheduled with a general education teacher and a special education teacher that co-taught a Language Arts class. During the follow-up meeting, the researcher and both teacher participants discussed specific procedural details and established a timeline for the study. The researcher also provided each teacher participant with a consent document to keep for their records that disclosed that (1) the activities involve research, (2) participation is voluntary, (3) the procedures to be performed, and (4) the name and contact information of the researcher (see APPENDIX B TEACHER CONSENT DOCUMENT).

Once both teacher participants agreed to the study, the researcher asked the special education teacher to identify students who met eligibility requirements and send parent/guardian consent documents home to obtain parent/guardian consent to participate in the research study

(see APPENDIX C PARENT CONSENT DOCUMENT). The parent/guardian consent

document also disclosed that (1) the activities involve research, (2) participation is voluntary, (3)

the procedures to be performed, and (4) the name and contact information of the researcher. The

parent/guardian consent document required a parent/guardian signature to indicate that

permission had been given for the student to participate in the study. Once parental consent was

obtained, an assent meeting was scheduled with eligible students to ensure that the students

understood what they would be asked to do and that they were free to decide whether or not to

participate. Four students were identified as eligible for participation in the study and were given

parent/guardian consent documents to take home. Two students returned signed parent/guardian

consent documents, the third student's parent did not provide consent to participate, and the

fourth student did not return the parent/consent document. The special education teacher

participant followed up with the fourth student's parent by phone to answer any questions or

address any concerns that the parent may have but was unable to reach the parent within the time

allocated to obtain consent. As a result, the recruitment procedures yielded one middle school

principal, one general education teacher participant, one special education teacher participant,

and two student participants. Student participant characteristics are illustrated in Table 2.

Table 2. Participant Characteristics

Participant	Gender	Grade	Age	Disability Category	FCAT reading level

Participant 1	Male	7	13	ADHD/OHI	Level 2
Participant 2	Male	7	14	SLD	Unavailable

Note. ADHD = attention deficit-hyperactivity disorder. OHI = other health impaired. SLD = specific learning disability.

Setting

The District

The study took place in a large urban district located in central Florida. The Florida Department of Education Bureau of Exceptional Education and Student Services released a 2010 Local Education Agency (LEA) Profile. According to the 2010 LEA Profile, the district has 211 schools, and educates over 170,000 students, approximately 13% of which were served under IDEA. District-wide racial/ethnic distribution data revealed that 33% of students with disabilities are White, 29% are Black, 34% are Hispanic, and 2% are Multiracial. Additionally, Asian/Pacific Islanders and American Indian/Alaskan Native accounted for 5% and less than 1% of students with disabilities, respectively. Graduation data from the 2008-2009 school year reported that 57% of students with disabilities graduated from high school with a standard diploma compared to the state average of 50%. Approximately 2% of students with disabilities dropped out of school during the 2008-2009 school year compared to the state average of 4%. Placement data for the 2009-20010 school year revealed that approximately 70% of students with disabilities spent 80% or more of the school week with peers without disabilities while 11 and 15% of students spent 40-80% and less than 40% with peers without disabilities respectively. Data for the 2008-2009 school year indicated that less than 1% of students with

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disabilities were suspended/expelled for greater than 10 days but data were not disaggregated by disability.

The School

This study took place in a public middle school located in the central Florida area. According to U.S. Department of Education's Common Core of Data database website, the research site is a midsize regular school that served approximately 1,125 students in grades 6-8 during the 2007-2008 school year; approximately .3% of which were American Indian/Alaskan, 3% were Asian, 9% were Black, 15% were White, and 71% were Hispanic. Approximately 15% of the students were eligible for reduced-price lunch and 65% for free lunch.

The Class

The classroom in which this study took place was a 7th grade Language Arts class with one highly qualified general education teacher and one highly qualified special education teacher. The general education and special education teachers practiced the one teach-one drift model of co-teaching where the general education teacher provided the majority of the instruction and the special education teacher supported the instruction with accommodations, modifications, and individual support as needed (Friend & Cook, 2003). The class was the last of 7 periods that met each day of the week. Approximately 21 students were enrolled in the class; 4 of which were students with disabilities. The students sat in assigned seats and were organized in rows that faced a whiteboard in the front of the classroom. Participant 1 sat in the last seat in a row located in the center of the classroom. Participant 2 sat in the second seat in a

row located near the door on the right side of the classroom. The classroom teachers established a daily routine that began with bell work, followed by whole group instruction and guided practice, and ended with independent practice and individual assistance.

Variables

Independent Variable

The independent variable in this study was CellF-Monitoring, a researcher-developed self-monitoring procedure that utilized cell phone technology. Self-monitoring was defined as a procedure by which the participant is (1) provided with a cue, (2) assesses the occurrence or nonoccurrence of the target behavior, and (3) records the occurrence or nonoccurrence of the target behavior (Nelson & Hayes, 1981). The CellF-Monitoring procedure utilized a cell phone to update two of the components of self-monitoring, cueing and recording. The cueing component was updated using a cell phone by sending text messages to the student participants' cell phones four times during the experimental class period at fixed intervals. The text messages served as cues to the student participants to self-assess the targeted behavior. The recording component was updated using a cell phone by having the student participants record the occurrence or nonoccurrence of the targeted behavior by responding to each of the four text message cues on the cell phone.

The Cell Phones

The study used prepaid, no-contract phones to maximize control over the functionality of the cell phones and to minimize inappropriate use of the cell phones by the student participants.

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The Virgin Mobile Kyocera Jax cell phone was chosen for the study based on functionality, appearance, and cost. Functionality of the cell phone was the first priority for choosing the cell phone. It was imperative that the cell phone have text message capabilities and vibrate as an option for incoming text message alerts. Next, appearance was considered. The Kyocera Jax is a standard "candy bar" phone. The approximate dimensions of each phone are 4.3 in x 1.7 in x .5 in; weighs 2.5 oz; and has a screen size of 1.8 in, which is consistent with current, popular cell phone models and would be inconspicuous in inclusive settings. Finally, cost was considered. Since the study was researcher-funded, the cost of each cell phone needed to be kept to a minimum while maintaining functionality. The Kyocera Jax cell phone costs approximately $14.99 plus tax at most Best Buy stores or $9.99 plus tax on the Virgin Mobile website (www.virginmobileusa.com). The researcher purchased one cell phone from a local Best Buy store first to assess functionality of the cell phone in person before purchasing the number of cell phones required for the study. Once the cell phone was purchased from Best Buy, the researcher activated the cell phone on the Virgin Mobile website. The website provided step-by-step directions to activate, choose a plan, and receive the phone number. The entire activation process took less than 10 minutes. A Virgin Mobile Texter's Delight plan was purchased for the cell phone that included 1000 text messages per month for $14.99. After testing the functionality of the cell phone for the purposes of the study, the researcher purchased an additional phone from Best Buy. The second cell phone was activated using the same steps used to activate the first cell phone.

<u>Text Message Cues</u>

Each student participant received four text message cues on the cell phone at fixed intervals throughout each observation session in the experimental classroom. The text message cues and the students' replies had to be alternated because the social network used to exchange text messages did not allow duplication of messages. In other words, the same message could not be sent twice in a row. The first and fourth text message cues were composed ahead of time and scheduled to be sent to each participant at predetermined dates and times by the researcher. A social networking application was used in conjunction with a third party application to compose, schedule, send, and receive text message cues to and from cell phones. The second and third text message cues were composed and sent directly from the researcher's cell phone during the observation session to compare the researcher's observation with the student participants' response at the same point in time.

The Twitter social networking application was used as the central location through which all text message cues and replies between the researcher and student participants were exchanged (see Figure 1). Twitter is a social networking application where friends, family, and co–workers can communicate the exchange of quick, frequent messages of 140 characters or less, called tweets (www.twitter.com). The tweets are posted to your profile and can be forwarded to a cell phone as text messages. In order for text message cues and replies to be exchanged as tweets through Twitter, the researcher had to create and configure free Twitter accounts for the researcher and each student participant. First, the researcher registered for three different Twitter

accounts (www.twitter.com); a researcher account and two student participant accounts. The

researcher used generic usernames and passwords for each of the three accounts (e.g., student1

for username and password). Second, each of the three accounts was set to private to ensure that

only student participants received the researcher's text message cues, or tweets, and only the

researcher received the student participants' replies, or tweets. Third, each student participant

account was set to follow the researcher account and the researcher account was set to follow

each student participant account. Student participant accounts did not follow each other to

ensure that participants only received tweets sent by the researcher and not Tweets sent by the

other student participant. Lastly, the researcher enabled the mobile feature for each of the three

accounts. The mobile feature allowed each student participant to receive the tweets on his cell

phone and the researcher to receive each of the student participant's tweets on her cell phone.

Once the Twitter accounts were created and configured, access to the Twitter website was not

required by teacher participants, student participants, or the researcher during school hours.

Figure 1. Twitter Home Page.

The scheduled text message cues, or tweets, were sent to the student participants' cell phones twice during each observation session in the experimental classroom at fixed intervals using a third-party application called HootSuite (see Figure 2). HootSuite is a Professional Social Media Dashboard where individuals and companies can manage multiple social networking profiles and track followers (www.hootsuite.com). The researcher registered for a free HootSuite account and linked the researcher and student participant Twitter accounts to the HootSuite account. In addition to providing a platform to compose and schedule text message cues, HootSuite allowed the researcher to follow all text message cues sent and all student participant replies in one window on a computer (see Figure 3).
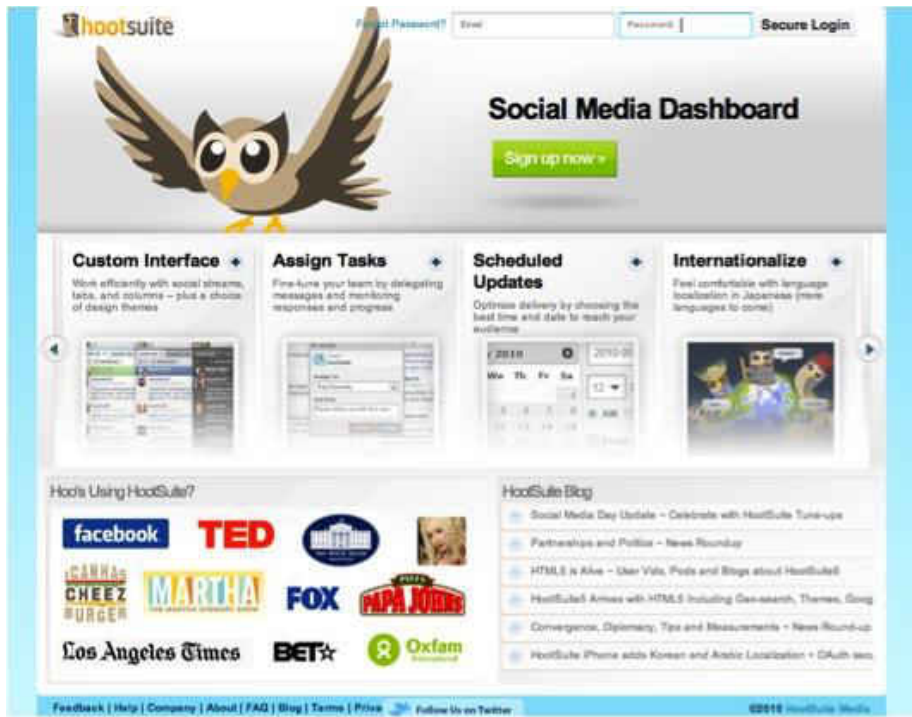
Figure 2. HootSuite Home Page.
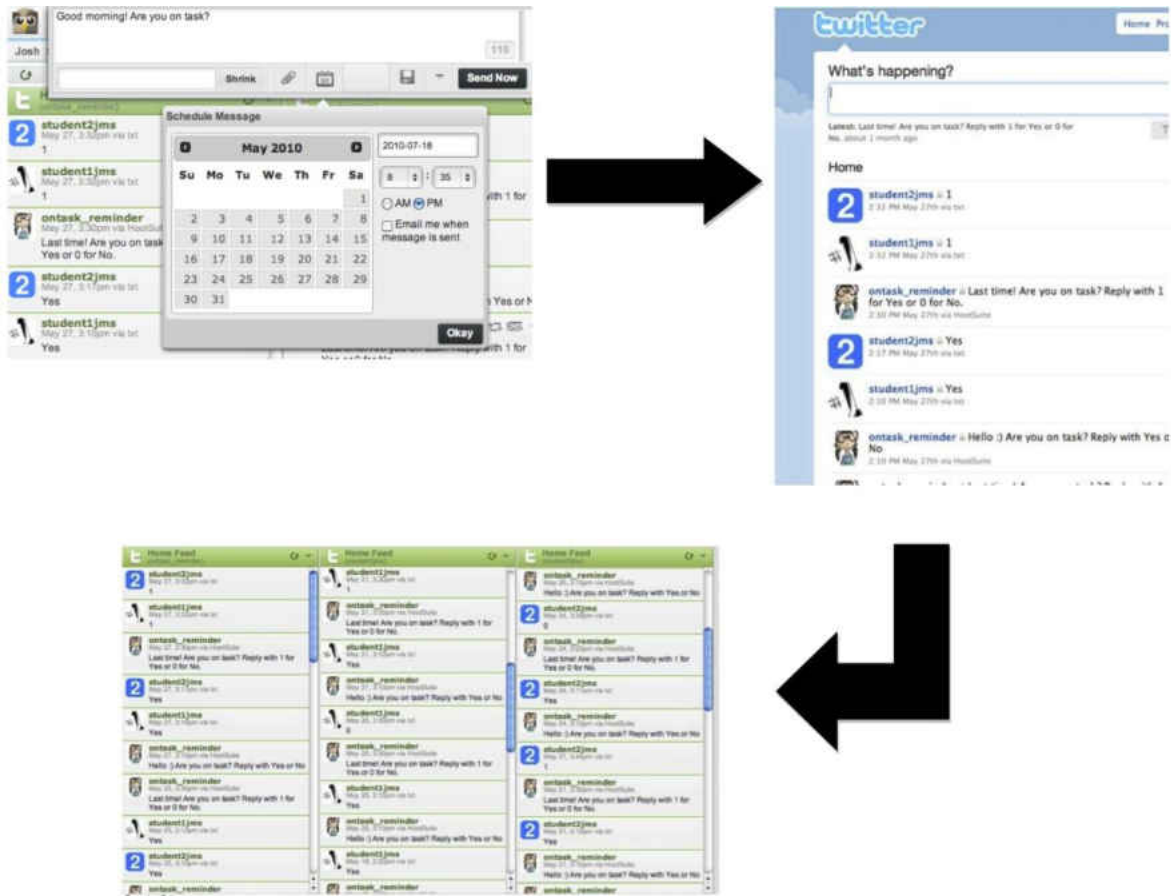
Figure 3. CellF-Monitoring Cueing Procedure.

Dependent Variables

The study had two dependent variables: (1) on-task behavior and (2) the social validity of the intervention. The first dependent variable, on-task behavior, was operationally defined as: (a) in seat (buttocks were on the seat of the chair unless given permission, student's feet do not have to be on the floor, all four feet of chair do not have to be on the floor), (b) quiet, unless given permission to speak (not talking, whispering, or mouthing to others without permission), (c) not disrupting others (passing a note, touching another student's body or possessions), (d)

following teacher directions, and (e) eyes on the task, teacher, or speaker. On-task behavior was measured by direct observation using momentary time sampling with 1-minute intervals. Momentary time sampling was chosen for this study because it allowed one observer to record the behavior of multiple participants during the same observation session (Kennedy, 2005) and accommodated data collection over long periods of time (Gunter, Venn, Patrick, Miller, & Kelly, 2003). One-minute intervals were chosen to minimize the underestimation or overestimation of the occurrence of the observed behavior that occurred as a function of the duration and frequency of the behavior and the length of the intervals (Kennedy, 2005). The data collected were used to estimate the percentage of time on task for each observation session by dividing the number of intervals marked as on task by the total number of intervals observed and multiplied by 100.

The second dependent variable was the social validity of the CellF-Monitoring procedure. An intervention is considered socially valid if the target behavior is socially relevant; the intervention procedures can be implemented by classroom teachers with fidelity using available resources; and the intervention produces positive outcomes (Horner et al., 2005). A questionnaire was provided to each participant that addressed the social relevance of the targeted behavior, the intervention procedures as observed by the teacher and used by the student participants, and the behavioral outcomes of the intervention (see APPENDIX D SOCIAL VALIDITY QUESTIONNAIRE). Teacher and student participant responses on a social validity questionnaire were used to determine the social validity of the intervention.

Research Design

Single-subject research was employed for the purposes of this study. Single-subject research is (a) practical for evaluating behavioral interventions, (b) practical for evaluating behavioral interventions in typical classroom settings, and (c) cost-effective (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). In order to provide a high level of experimental rigor, the researcher followed the quality indicators for single-subject research suggested by Horner, Carr, Halle, McGee, Odom, and Wolery (2005) that include specifications for participants and settings, dependent variable, independent variable, baseline, internal validity, external validity, and social validity.

The researcher utilized a multiple-baseline-across-participants design to determine the effects of CellF-Monitoring, a self-monitoring procedure that utilized cell phone technology on the on-task behavior of middle school students with high incidence disabilities in inclusive settings. A multiple-baseline-across-participants design was chosen for the purposes of this study to, first, determine the effects of the intervention; and, second, to demonstrate the effectiveness of the intervention by replicating the treatment effects on an additional participant instead of withdrawing the intervention once implemented (Baer, Wolf, & Risley, 1968; Kazdin, 1982; Tawney & Gast, 1984). Multiple-baseline designs replicate treatment effects by gradually introducing the intervention to different baselines such as behaviors, individuals, or conditions (i.e., situations, settings, or time). Once treatment effects are demonstrated in one baseline, the intervention is introduced to the next baseline (Kazdin, 1982; Tawney & Gast, 1984). Multiple-

baseline designs require only two baselines to show a replicated effect (Kennedy, 2005). As such, this study met the minimum requirements for demonstrating the effectiveness of the intervention by targeting two baselines (i.e., two participants).

In addition to identifying effective interventions, single-subject research also identifies interventions that functionally relate to socially relevant outcomes. According to Horner et al. (2005), socially relevant interventions are identified by research procedures and findings that are socially valid, or practical. In other words, interventions are socially valid if the research procedures and findings are socially valid. Social validation of single-subject research, and interventions, occurs at three levels (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005; Wolf, 1978). The first level is targeting a dependent variable that is socially relevant. The second level is demonstrating that the independent variable, or intervention, can be applied with fidelity by teachers in typical classroom settings. The third level is demonstrating that teachers find the intervention procedures acceptable, applicable with available resources, and effective. For the purposes of this study, questionnaires were used to determine the social validity of the CellF-Monitoring procedure.

Internal Validity

Internal validity refers to the extent to which the researcher can rule out extraneous variables and be confident that the independent variable is what changed the dependent variable (Kazdin, 1982; Kennedy, 2005). According to Horner et al. (2005), "single subject research designs provide experimental control for most threats to internal validity and, thereby, allow

confirmation of a functional relationship between manipulation of the independent variable and change in the dependant variable" (p. 168). Typically, experimental control is demonstrated by documenting treatment effects at three different times with a single participant or across different participants (Horner et al., 2005). Specifically, multiple-baseline research designs demonstrate experimental control by the "staggered introduction of the independent variable at different points in time" (Horner et al., 2005, p. 168).

Eight types of threats to internal validity are known to exist (Kazdin, 1982; Kennedy, 2005; Tawney & Gast, 1984): (1) history effects, (2) maturation effects, (3) testing effects, (4) instrumentation effects, (5) regression to the mean, (6) participant selection bias, (7) selective attrition of participants, and (8) interactions among selective attrition and other threats. Of the eight known threats to internal validity, the researcher identified history effects, maturation effects, instrumentation effects, and participant selection bias as threats to this study. First, the researcher addressed history and maturation effects by demonstrating treatment effects across participants. Next, to address instrumentation effects, trained inter-observers conducted 40% of the observations. Lastly, participant selection bias was addressed to the maximum extent possible; however, the scope of the research coupled with limited access to a wide range of diverse populations contributed to participant selection bias.

External Validity

External validity "refers to the extent to which the results of an experiment can be generalized or extended beyond the conditions of the experiment" (Kazdin, 1982, p. 81).

Replication on participants, settings, materials, and/or behaviors strengthen external validity even if a study involves only one participant (Horner et al., 2005) and is the primary means of establishing external validity in behavioral science (Barlow & Hayes, 1979). This study demonstrated external validity by replicating treatment effects across more than one participant. Spill-over effect, where improved behavior of participants increases the likelihood of improved behavior of the other participants (Kazdin, 1982; Kennedy, 2005), was determined to be a threat to external validity. During initial observations, the researcher noted that minimal interaction between the student participants and assigned seating at opposite sides of the room minimized the threat of any spill-over effects.

Reliability

Reliability, or inter-observer agreement "refers to the extent to which observers agree in their scoring of behavior" (Kazdin, 1982, p 48). According to Kazdin (1982), reliability is critical when different observers are recording behavior for three reasons. First, consistency between observers minimizes variation in the data and allows researchers to establish a pattern of behavior. Second, evaluating observer agreement moderates the effects of observer bias and ensures consistent response definitions over time. Third, consistency in observer agreement is an indication that the target behavior is operationally defined with a clear distinction between its occurrence and nonoccurrence.

Inter-Observer Agreement

The three most common methods of calculating inter-observer agreement are frequency ratio, or total agreement; point-by-point agreement, or interval agreement (Kazdin, 1982; Kenney, 2005; Tawney & Gast, 1984); and occurrence/nonoccurrence agreement (Kennedy, 2005). Frequency ratio is used to determine the agreement between the totals of two or more independent observers (Kazdin, 1982). However, frequency ratio does not determine the agreement of each instance of recorded behavior, only agreement of the total frequency counts of recorded behavior (Kazdin, 1982; Kennedy, 2005). A more precise assessment of agreement is point-by-point agreement (Kazdin, 1982; Kennedy, 2005; Tawney & Gast, 1984). Unlike frequency ratio, point-by-point agreement ratio assesses agreement between observers for each instance of recorded behavior (Kazdin, 1982). An even more stringent method of assessing inter-observer agreement is to calculate interval agreement for both the occurrence and nonoccurrence of behavior (Kennedy, 2005). According to Kennedy (2005), "this approach allows for the calculating of two agreement coefficients: one for the occurrence of the response and one for the nonoccurrence of the response" (p. 117).

For the purposes of this research study, the researcher used point-by-point agreement as an overall index of inter-observer agreement and occurrence/nonoccurrence agreement to "fully characterize the degree to which consistency was obtained by different observers" (Kennedy, 2005, p. 118). First, point-by-point agreement was calculated using the following formula (Kazdin, 1982; Kennedy, 2005) and steps (Kennedy, 2005, p. 116):

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$$\left(\frac{Agreements}{Agreements \ + \ Disagreements}\right) \times 100$$

Step 1: Score each interval as an agreement or disagreement

Step 2: Sum the number of agreements

Step 3: Sum the number of disagreements

Step 4: Divide the number of agreements by the number of agreements

plus disagreements

Step 5: Multiply the quantity from Step 4 by 100

Second, occurrence and nonoccurrence was calculated by using the same formula used to

calculate point-by-point agreement. Two calculations were conducted and reported separately

for agreement of occurrence and agreement of nonoccurrence (Kennedy, 2005).

Inter-Observer Training

The systematic inter-observer training was conducted as suggested by Kennedy (2005).

The training took place in a designated training room at the university and lasted approximately

two hours. Observation materials included the operationally defined target behavior (on-task

behavior), the recording instrument, an MP3 player, and one pair of earbuds. First, the inter-

observer was provided with the operationally defined target behavior, on-task. The researcher

demonstrated examples and nonexamples of on-task behavior in accordance with the operational

definition used for the study. Next, the inter-observer was trained to use the recording

instrument. The inter-observer was directed to use "1" to indicate the occurrence of the targeted

behavior and "0" to indicate nonoccurrence of the targeted behavior. Third, the inter-observer

was given the MP3 player and one pair of earbuds. The MP3 player contained a file with audio

tones indicating the end of each 1-minute observation interval. The inter-observer knew how to

operate the MP3 player so no practice was needed. A practice session was conducted in the

experimental classroom. The researcher and the inter-observer observed the student participants

and compared observations to ensure that the inter-observer accurately discriminated between

the occurrence and nonoccurrence of the targeted behavior.

<div align="center">Procedures</div>

This study was conducted in three phases: (1) baseline phase, (2) intervention phase, and

(3) post-intervention phase. The baseline phase included data collection on the on-task behavior

of the student participants before implementation of the intervention. The intervention phase

included: (a) teacher participant training, (b) student CellF-Monitoring training, and (c)

implementation of the intervention. The post-intervention phase included dissemination of the

social validity questionnaires.

<div align="center">Observation and Recording Procedures</div>

The researcher conducted twenty-minute observations at approximately the same time

each day using momentary time sampling with 1-minute intervals (see APPENDIX E

OBSERVATION RECORDING SHEET). Direct observation began approximately ten minutes

after the tardy bell rang and continued for twenty minutes. Direct observation of the participants

alternated with each interval. For instance, the observer recorded the occurrence or

<div align="center">60</div>

nonoccurrence of the behavior for the first student participant at the end of the first interval and then recorded the occurrence or nonoccurrence of the behavior for the second student participant at the end of the second interval, which resulted in 20 observations for each student participant during each observation session. Each member of the research team (i.e., researcher and trained inter-observer) used an MP3 player containing a file with audio tones indicating the end of each 1-minute interval at which point the occurrence or nonoccurrence of the targeted behavior was recorded. The observer recorded a "1" if the student participant was on-task and a "0" if the student participant was not on-task at the time the audio tone was heard.

<div align="center">Baseline Phase</div>

Baseline data were collected for each student participant in the experimental classroom for at least four days prior to implementation of the intervention. Baseline data were collected for Participant 1 until a clear pattern of behavior was established. A clear pattern of behavior was established when three consecutive data points did not vary more than 50% from the mean. Once the criterion was met for establishing a clear pattern of behavior, a phase-change occurred from the baseline phase to the experimental phase. For Participant 2, baseline data were collected until a clear pattern of behavior was established by the first participant during the intervention phase at which point the intervention was implemented for the second participant. Decisions to change from baseline to experimental phases were not solely based on this criterion. Factors such as level, trend, and time spent in baseline were considered in phase-change decisions.

Teacher Participant Training

      The researcher conducted a teacher participant training to establish teacher behavior protocols for the experimental phase. The training took place in the general education teacher participant's classroom with both participating teachers and lasted approximately thirty minutes. The teachers were given a protocols sheet (see F TEACHER PROTOCOLS) that specifically outlined the parameters of teacher behaviors for the duration of the study. The researcher began the training session by defining traditional self-monitoring as a procedure by which a student (1) is provided with a cue to (2) assess the occurrence or nonoccurrence of the target behavior and (3) record the occurrence or nonoccurrence of the target behavior (Nelson & Hayes, 1981); and on-task behavior as (a) in seat (buttocks were on the seat of the chair unless given permission, student's feet do not have to be on the floor, all four feet of chair do not have to be on the floor), (b) quiet, unless given permission to speak (not talking, whispering, or mouthing to others without permission), (c) not disrupting others (passing a note, touching another student's body or possessions), (d) following teacher directions, and (e) eyes on the task, teacher, or speaker. Next, the researcher explained the procedures for each component of the CellF-Monitoring procedure in detail. Finally, the researcher stressed the importance of consistency of teacher behavior in the experimental classroom in establishing experimental control and asked that the teachers remained consistent with the provision of specific and general praise/feedback; individual and group contingency plans; and disciplinary actions that were established prior to
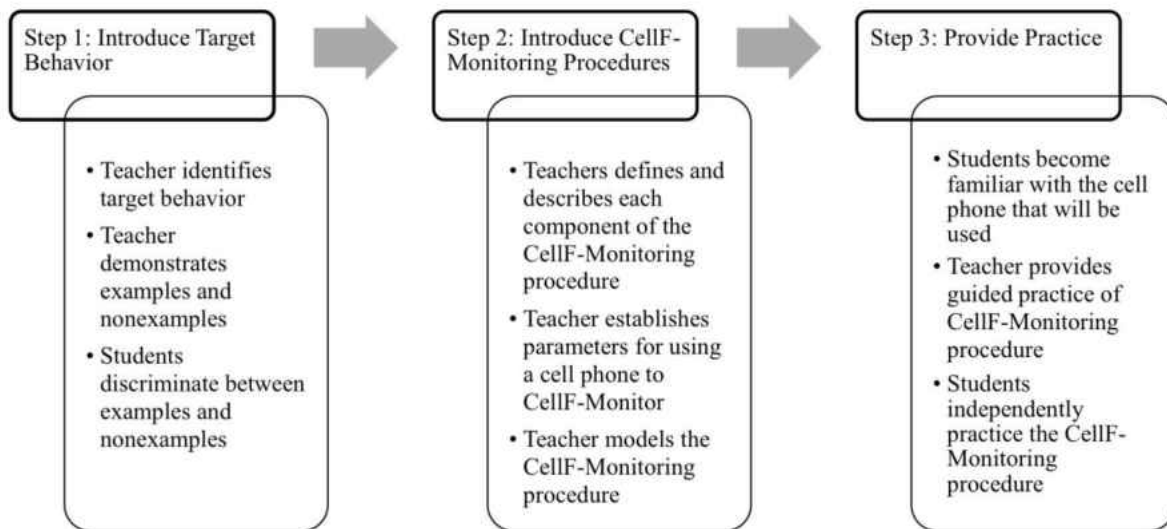
participation in the study. In other words, the teachers were asked not to change the way they typically interacted with the student participants once the study began.

<u>Student CellF-Monitoring Training</u>

The researcher developed the training sequence, Three Steps to CellF-Monitoring, by adapting King-Sears and Bonfils' (1999) self-management design-and-instruction sequence, SPIN. The SPIN sequence consists of four phases, two of which relate to design, one to instruction, and one to progress monitoring. Unlike the SPIN sequence, the adapted version, shown in Figure 4, is only an instructional process and does not contain a design component. Once the CellF-Monitoring training sequence was developed, the researcher created a training presentation using Microsoft Power Point to facilitate student CellF-Monitoring training (see APPENDIX G CELLF-MONITORING TRAINING PRESENTATION). In order to ensure a high level of training fidelity, the researcher also created and used a training fidelity checklist (see APPENDIX H CELLF-MONITORING TRAINING CHECKLIST).

Each training session began with identifying and defining the target behavior; and brainstorming reasons why being on-task is important. To demonstrate the ability to discriminate between examples and nonexamples of the target behavior, the student participant watched the researcher act out examples and nonexamples of each identifying characteristic of the target behavior and was asked to discriminate between the examples and nonexamples. Then, the student participant had to discriminate between examples and nonexamples of each

characteristic of the target behavior by demonstrating behaviors of each at the request of the researcher.

Step 1: Introduce Target Behavior
- Teacher identifies target behavior
- Teacher demonstrates examples and nonexamples
- Students discriminate between examples and nonexamples

Step 2: Introduce CellF-Monitoring Procedures
- Teachers defines and describes each component of the CellF-Monitoring procedure
- Teacher establishes parameters for using a cell phone to CellF-Monitor
- Teacher models the CellF-Monitoring procedure

Step 3: Provide Practice
- Students become familiar with the cell phone that will be used
- Teacher provides guided practice of CellF-Monitoring procedure
- Students independently practice the CellF-Monitoring procedure

Note. Adapted from "Self-Management Instruction for Middle School Students with LD and ED," by M. E. King-Sears, and K. A. Bonfils, 1999, *Intervention in School and Clinic, 35*, p. 100.

Figure 4. Three Steps to CellF-Monitoring.

Next, the researcher introduced the CellF-Monitoring procedure. First, the researcher defined and explained the purpose of self-monitoring. Second, the researcher described the CellF-Monitoring procedure in detail. Next, the researcher reviewed the parameters for when and how to use the cell phone to CellF-Monitor. For example, each student participant was informed that the cell phone was only to be used for the CellF-Monitoring procedure. Then, the researcher modeled the entire CellF-Monitoring procedure, including the use of the cell phone, through role-play.

Each session concluded with the student participant demonstrating the ability to perform the entire CellF-Monitoring procedure. First, the student participant familiarized himself with

the intervention cell phone by turning the cell phone on/off, accessing the text message function, opening unread text messages, and responding to text messages with "1", "0", "Yes", and "No". Second, the researcher provided guided practice by sending the student participant the text message cue and guiding him through the entire CellF-Monitoring procedure. Finally, the researcher provided the student participant with the opportunity for independent practice by sending him a text message cue to initiate the CellF-Monitoring procedure. Opportunities for independent practice were provided as needed for the remainder of the training session.

Intervention

The intervention was implemented in the experimental classroom the first school day immediately following the student CellF-Monitoring training session. Once the intervention was implemented in the experimental classroom, the student participant got the cell phone from the researcher upon entering the classroom and returned it upon exiting the classroom.

Each student participant used the CellF-Monitoring procedure to self-monitor his own on-task behavior in the experimental classroom. Each student participant received four text message cues at fixed intervals throughout each experimental class. The first text message cue was scheduled to be sent 1-2 minutes before direct observation began and asked "Are you on task?" with a choice of "Yes" or "No" for the response. The second and third text message cues were sent during direct observation from the researcher's cell phone directly to the participants' cell phones at 7 and 14 minutes, respectively. Both text message cues asked "Are you on task?" with a choice of "1 for Yes" and "0 for No". The fourth text message cue was scheduled to be

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sent 1-2 minutes after direct observation ended and asked "Last time for this class! Are you on task?" with a choice of "1 for Yes" or "0 for No". The first and fourth text messages were composed and scheduled using HootSuite and exchanged through Twitter. The questions and response choices had to be different because Twitter does not allow duplication of tweets. In other words, Twitter will not post tweets that are repeated. The text message cues sent during direct observation were the same because repetition of questions and responses was not an issue when sent directly from one cell phone to another using a cell phone's text messaging function. Although the text message cues were sent at fixed intervals there were a few instances when, the time between when the text message cues were sent and the time the student participants received the text message cues varied up to 30 seconds depending on cellular transmission factors that were beyond the control of the researcher.

Post-Intervention Phase

The study concluded with the social validity questionnaire. The researcher developed and administered a questionnaire to determine the social validity of the CellF-Monitoring procedure. The first part of the questionnaire addressed participants' average use and knowledge of cells phones and text messaging. The second part of the questionnaire was specific to the targeted behavior and the intervention. Additionally, the researcher developed participant-specific questionnaires. For example, a questionnaire was developed for the teacher participants and a questionnaire was developed for the student participants. Teacher participants were asked if the student participants' problem behavior warranted the intervention, if the intervention was

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appropriate for the problem behavior, and if the intervention produced a positive change in the student participants' problem behavior. Student participants were asked what they liked about the intervention, what they disliked about the intervention, if the intervention helped them stay on task, and if they would use the intervention in other classes.

Data Analysis

On-Task Behavior

Direct observation data for student participants' on-task behavior were collected and graphically displayed to provide a detailed summary of (1) the sequence of experimental conditions, (2) the time spent in each condition, (3) the independent and dependent variables, (4) experimental design, and (5) the relationship between the variables (Tawney & Gast, 1984). According to Kennedy (2005), visual inspection of data is accomplished by "analyzing specific types of patterns in the data display" (p. 196), including level and variability of the data. Level of the data refers to the average of the data within a condition. The level was calculated and reported as the mean. Variability of the data refers to the degree to which individual data points deviate from the trend and was reported as the range.

Social Validity

Questionnaires were developed to determine the social validity of the CellF-Monitoring procedure. The questionnaires were specific to the teachers' and students' interaction with the intervention procedures. Teacher participants were asked about the social relevance of the target behavior, appropriateness of the procedures in addressing the target behavior, practicality of the

procedures, effectiveness of the intervention, and their willingness to use the intervention in the future. Student participants were asked what they liked and disliked about the CellF-Monitoring procedure, effectiveness of the intervention, and their willingness to use the intervention in other classes. Participant responses were reviewed and reported in narrative form.

CHAPTER FOUR: RESULTS

Introduction

The purpose of this research study was to determine the effects and social validity of CellF-Monitoring, an innovative self-monitoring procedure. The CellF-Monitoring procedure used cell phone technology to replace traditional cueing and recording procedures that typically incorporate cassette tape players, headphones, pencil, and paper. A multiple-baseline-across-participants design was employed to determine the effects of the CellF-Monitoring procedure on the on-task behavior of students with high incidence disabilities and a questionnaire was developed and administered to determine the social validity of the CellF-Monitoring procedure.

On-Task Behavior

The first research question sought to determine the affect of CellF-Monitoring on the on-task behavior of students with high incidence disabilities. Data were evaluated using visual inspection. The data paths represented in Figure 5 depict the percentage of intervals that were scored as on-task for each participant in the baseline and intervention phases of the study. Based on visual inspection, the data paths indicate that on-task behavior increased in the intervention phase for both participants. The results are also presented in Table 3.
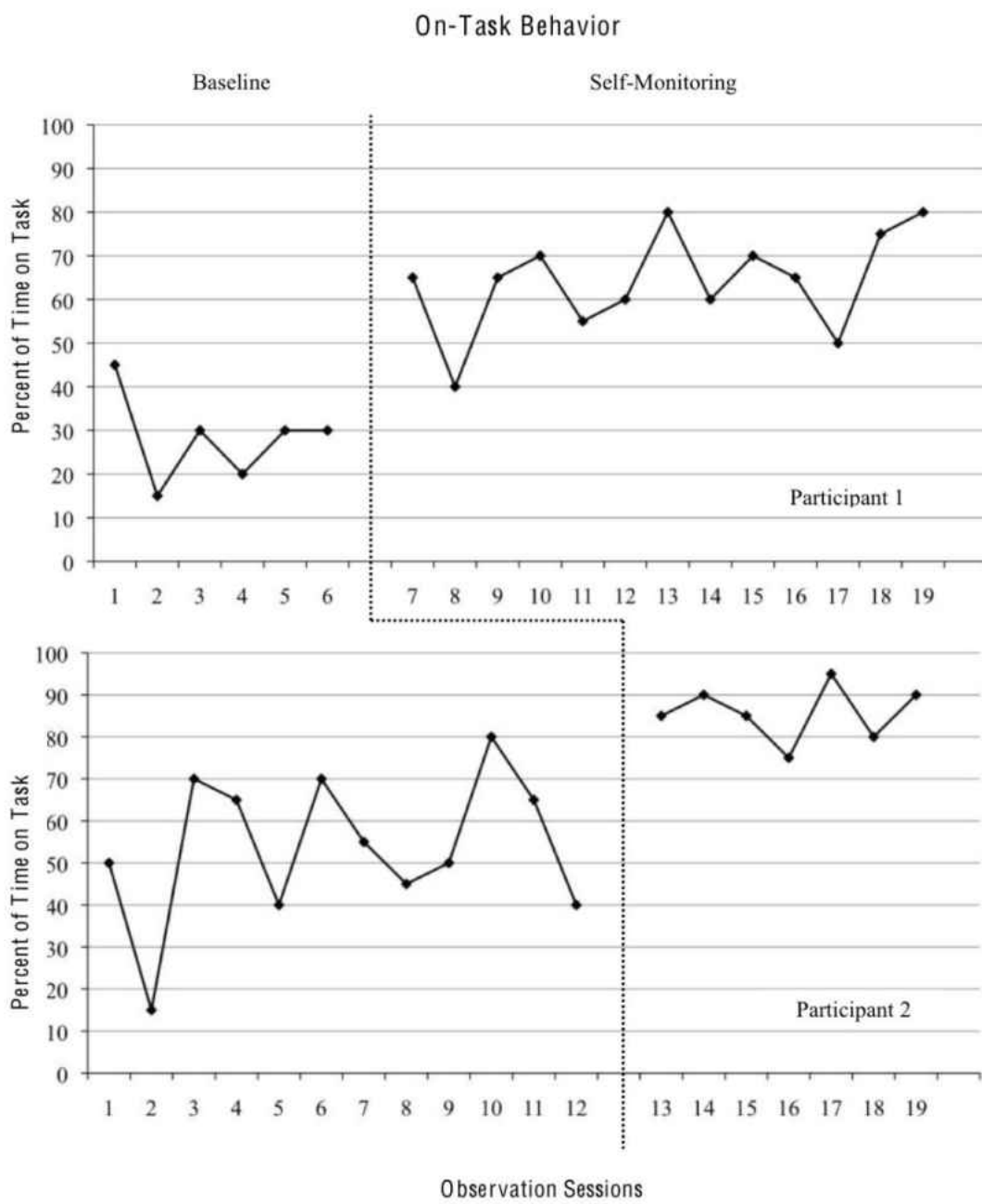
Figure 5. Observed On-Task Behavior.

Table 3. Results

	Participant 1		Participant 2	
	Baseline	Intervention	Baseline	Intervention
Mean	28	64	53	85
Range	30	40	65	20

The mean, or level, of observed on-task occurrences was calculated and used to compare the pattern of behavior between the baseline and the intervention phases. The total mean for both participants increased from 45% in the baseline phase to 71% in the intervention phase. The difference in means between the baseline phase and the intervention phase indicates an increase in participants' time on-task once the intervention was implemented. The first participant, Participant 1, was observed for six school days under baseline conditions and 13 days under intervention conditions. Baseline data demonstrated that Participant 1's mean on-task behavior was 28% indicating that he was on-task for 28% of observed intervals. During the intervention phase, his mean on-task behavior was 64% indicating that Participant 1 was marked as being on task for 64% of observed intervals once the intervention was implemented. Participant 1's mean on-task behavior in the intervention phase more than doubled from the baseline phase. The second participant, Participant 2, was observed for 12 school days under baseline conditions and seven days under intervention conditions. Baseline data demonstrated that Participant 2's mean on-task behavior was 53% indicating that he was observed demonstrating on-task behavior for over half of the observation intervals. During the

intervention phase, Participant 2's mean on-task behavior was 85%. Participant 2's mean on-task behavior increased from 53% in the baseline phase to 85% in the intervention phase.

The range, or variability, of observed on-task occurrences was also calculated and used to measure the spread of occurrences for each phase of the study. The range was calculated by subtracting the lowest percent of total observed on-task occurrences from the highest percent of total observed on-task occurrences for each phase. Participant 1's range increased from 30 in the baseline phase to 40 in the intervention phase. The increase in range indicates that Participant 1's on-task behavior was more stable in the baseline phase than in the intervention phase. Participant 2's range decreased from 65 in the baseline phase to 20 in the intervention phase. The decrease in range indicates that Participant 2's on-task behavior was more stable in the intervention phase than in the baseline phase.

The data demonstrate that the intervention had a positive impact on the on-task behavior of both participants. Participant 1's mean on-task behavior more than doubled from the baseline phase to the intervention phase. Participant 2's mean on-task behavior increased from 53% to 85% in the baseline and intervention phases, respectively. Conversely, Participant 2's on-task behavior showed an increase in stability in the experimental phase, whereas Participant 1's behavior became less stable in the intervention phase.

Social Validity

The second research question sought to determine the social validity of the CellF-Monitoring procedure. Social validity of the CellF-Monitoring procedure was determined based

on participant responses to questionnaires. The general and special education teachers had identical responses indicating an overall satisfaction with the CellF-Monitoring procedure. Specifically, the teacher participants reported that the target behavior was socially relevant and warranted the use of the intervention, the intervention was appropriate for the target behavior, and the intervention produced positive effects on the target behavior. Additionally, teacher participants did not feel that the intervention procedures were distracting to other students in the classroom and expressed an interest in using the intervention in the future.

The student participant responses also indicated an overall satisfaction with the CellF-Monitoring procedure. Both student participants indicated that they liked the CellF-Monitoring procedure and it helped them stay on task; however, Participant 1 reported that the intervention was distracting at times. Participant 2 expressed excitement at the possibility of using the CellF-Monitoring procedure in other classes in the future. Participant 1 expressed uncertainty with future use of the intervention but did not elaborate or explain his apprehension.

<center>Inter-Observer Agreement</center>

According to Kennedy (2005), the current convention is that at least 20% and preferably 33% of total observations have inter-observer agreement checks. Five inter-observer agreement checks were made during the course of the current research study, representing approximately 30% of total observations and exceeding the minimum suggested by Kennedy. Percentages were calculated for occurrence (both observers agreed that the participant was on task), nonoccurrence (both observers agreed that the participant was not on task), and total agreement (overall

<center>73</center>

agreement between the observers). Agreement for occurrence was 95% and agreement for

nonoccurrence was 93%. Overall agreement between both observers was 94%. All of the inter-

observer agreement calculations yielded agreement percentages above 80%, which is the

standard minimum required for reliability (Kennedy, 2005). Exceeding the standard minimum

for reliability indicating (1) minimal variation in the data allowed the researcher to establish a

clear pattern of behavior, (2) minimal observer bias, and (3) that the target behavior was

operationally defined with clear distinctions between its occurrence and nonoccurrence (Kazdin,

1982; Kennedy, 2005).

CHAPTER FIVE: DISCUSSION

Introduction

The purpose of this chapter is to discuss the results of this research study. The chapter opens with a summary of the findings organized around each of the dependant variables. Next, the unique challenges presented by the study are described followed by the limitations specific to the current study. Finally, the chapter closes with recommendations for future research.

Summary of Findings

The overall aim of this study was to investigate an innovative method for students with high incidence disabilities to self-monitor their behavior to promote self-regulation and, ultimately, success in inclusive settings. Specifically, the study focused on determining (1) the effects of CellF-Monitoring on the on-task behavior of middle school students with high incidence disabilities in inclusive settings and (2) the social validity of the CellF-Monitoring procedure in inclusive settings. The intervention for this study, CellF-Monitoring was a self-monitoring procedure that used a cell phone as a cueing and recording device. The study was conducted in an inclusive middle school Language Arts classroom with two participants with high incidence disabilities who received special education services.

On-Task Behavior

The results of this study demonstrated a functional relationship between the CellF-Monitoring procedure and on-task behavior for middle school students with high incidence disabilities. The total mean for both participants increased from 45% in the baseline phase to 71% during the intervention phase indicating that the CellF-Monitoring procedure had a positive influence on the participants' on-task behavior. Results of the current study support prior research findings that self-monitoring produces positive effects on students with high incidence disabilities in inclusive settings (Crum, 2004; DiGangi, Maag, & Rutherford, 1991; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Rock, 2005; Rooney, Hallahan, & Lloyd, 1984). Results also support prior research findings specific to students with ADHD and students with LD. Participant 1's increase of on-task behavior from a mean of 28% in the baseline phase to a mean of 64% during the intervention phase supports Harris and colleague's (2005) claim that self-monitoring effectively increases on-task behavior of students with ADHD. Similarly, Participant 2's increase from 53% during baseline to 85% during the intervention phases supports prior research concluding that self-monitoring effectively increases on-task behavior of students with LD (DiGangi et al., 1991).

A stabilizing trend for on-task behavior was not as consistent between the two participants. Overall variability of on-task behavior for both students decreased from a range of 65 in the baseline phase to a range of 55 in the intervention phase. Participant 2's range of on-task behavior decreased from 65 during baseline to 20 during the intervention phase indicating a

stabilizing trend from baseline to the intervention phase. However, Participant 1's on-task behavior range increased from 30 during baseline to 40 during the intervention phase indicating that his on-task behavior was more stable in the baseline phase than it was in the intervention phase. Participant 1's decrease in stabilization of on-task behavior was inconsistent with Harris, Friedlander, Saddler, Frizzelle, and Graham's findings that the on-task behavior of students with ADHD stabilized when self-monitoring procedures were implemented.

Social Validity

Social validity outcomes from the current study revealed that all of the participants, teachers and students, owned a cell phone at the time of the study. Additionally, both teacher and student participants indicated that they send and/or receive an average of 6-10 text messages each day. Data also revealed an overall satisfaction with the CellF-Monitoring procedure among the teacher and student participants, which were consistent with findings from previous research (Mathes & Bender, 1997; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999). The practicality of the self-monitoring device used in the CellF-Monitoring procedure was of particular interest and the focus for determining the social validity of the intervention. Teacher participants stated that they liked the intervention procedures and did not view the intervention device as a distraction to the student participants or their peers. Both teacher participants noted improvements in the on-task behavior of both student participants and expressed an interest in using the CellF-Monitoring procedure again in the future. In fact, an informal conversation with the special education teacher participant revealed that she noticed a significant decrease in the

number of times she had to redirect Participant 1's off-task behavior during the intervention phase.

The student participants indicated that they liked the CellF-Monitoring procedure and it helped them stay on task but had differing opinions about using the intervention in other classes. Participant 1 was not sure if he wanted to use the CellF-Monitoring procedure in other classes because he found the intervention procedures distracting at times. Participant 1's statement that the CellF-Monitoring procedure was sometimes distracting was unexpected, especially since he was able to respond to the text message cues in less than five seconds. The decision to use cell phones as the self-monitoring device was based on the prevalence of adolescents Participant 1's age owning and having cell phones with them at all times. Participant 2, on the other hand, stated that using the CellF-Monitoring procedure was fun and expressed that he would like to use the intervention in all of his classes.

Self-Monitoring and Technology

To date, only two studies have been conducted examining the effects of self-monitoring procedures that utilize technology, the current study and a study conducted by Gulchak (2008). Results from this study corroborate Gulchak's findings that self-monitoring procedures that incorporate mobile technology produce outcomes similar to the outcomes of traditional self-monitoring procedures found throughout the research literature. The differences in educational settings, grade level of participants, disability category of participants, and devices used to self-monitor provide three important insights. First, outcomes of both studies support the notion that

self-monitoring procedures effectively increase on-task behavior across educational settings and disability categories. Second, results from both studies suggest that self-monitoring procedures updated with technology still produce positive reactive effects on on-task behavior; and third, self-monitoring procedures updated with different types of technology produce similar outcomes.

Accuracy of Recording

An interesting pattern emerged during data analysis pertaining to recording accuracy that is noteworthy. Recording accuracy has produced fascinating trends throughout the research literature. For example, researchers have asserted that high levels of self-recording accuracy are not required for self-monitoring to influence behavior (Cavalier, Ferretti, & Hodges, 1997; Lipinski, Black, Nelson, & Ciminero, 1975; Nelson & Hayes, 1981) while others state that a minimum level of accuracy is required to produce positive reactive effects (Hallahan, Marshall, & Lloyd, 1981; McDougall & Brady, 1995). The contribution of recording accuracy has yet to be determined although recording accuracy data are commonly collected in self-monitoring studies. Although the influence of recording accuracy on the reactive effects of self-monitoring was not formally examined by the current study, results from secondary data warrant further discussion.

For the current study, accuracy of recording was determined by calculating the agreement of occurrence and nonoccurrence of on-task behavior between each participant and the researcher. Participant 2's level of overall recording accuracy was 100% indicating that his recording of occurrence and nonoccurrence of on-task behavior perfectly matched observation

79

data collected by the researcher. Participant 1, on the other hand, had an occurrence recording accuracy of 78% and a nonoccurrence recording accuracy of only 44%. Despite Participant 1's low level of nonoccurrence accuracy, his mean on-task behavior increased from 28% during baseline to 64% during the CellF-Monitoring phase. Data suggest that Participant 1's low level of recording accuracy did not affect the reactivity of the CellF-Monitoring procedures, which support early theory (Nelson & Hayes, 1981) and research findings (Cavalier, Ferretti, & Hodges, 1997; Lipinski, Black, Nelson, & Ciminero, 1975) claiming that high levels of recording accuracy are not required for positive reactive effects of self-monitoring to occur. It is unclear whether Participant 1's low level of nonoccurrence accuracy supports or refutes McDougall and Brady's (1995) assertion that a minimum level of recording accuracy must be achieved before positive reactive effects can occur because what constitutes a minimum level of accuracy has not yet been determined.

Unique Challenges

The unique challenges presented by the current research study offered interesting insights on the use of technology in the classroom but also raised additional questions for the future of technology in the classroom that require careful consideration.

Practical Challenges

Several practical challenges emerged while designing and conducting the current study. The first challenge was the self-monitoring device itself. Using a cell phone as the intervention device raised questions about confidentiality and maintaining control over how the device would

be used by participants in the classroom. Cell phones were chosen as the intervention device over other mobile technology devices because of their prevalence among students in secondary settings. Although allowing participants to use their own cell phones appeared more authentic in demonstrating the ubiquity of cell phones, the researcher decided to provide cell phones to the participants to minimize inappropriate use of the device by maintaining how and where the device was used by the participant.

The second and most significant challenge in conducting the current study was obtaining district approval to conduct the study in a public middle school. District personnel granted permission after two separate requests to conduct research. It was evident to the researcher that the first research request was denied solely based on the intervention device being a cell phone without consideration to any of the safeguards that were clearly outlined in anticipation of such a reaction by district personnel, school administrators, and classroom teachers. Although the request was denied, district personnel listed their concerns for the use of a cell phone as the intervention device and suggestions for revising the study to resubmit the request. The researcher reformatted the research request to make the same safeguards for the use of the cell phone as the intervention device that were in the first request more visible and reworded to specifically address each of the concerns listed by district personnel. Thus, the second request to conduct research in a public middle school was approved. The entire approval process took over six weeks – an extended timeline that was not anticipated by the researcher.

Technical Challenges

The current study assessed the effects of CellF-Monitoring, a self-monitoring procedure that utilized a cell phone as the cueing and recording device. As with any intervention that includes a technology component, using a cell phone as the cueing and recording device for self-monitoring was laced with various technical challenges. The first technical challenge was finding a way to automate the text message cues that would work across cell phones and networks to ensure that the practicality of the intervention and replicability of the study were not compromised in any way. The researcher conducted an internet search for a free universal cell phone or computer application that enabled automated text messages to be sent to cell phones. Although several were found, replies could not be sent directly from the receiving cell phone, which was required for the recording component of the intervention. Only one free application was found that allowed messages to be scheduled for delivery at specified date and time. HootSuite is a free computer application that allows registered users to compose and schedule messages. However, the scheduled messages cannot be sent directly from the application to a cell phone. The scheduling function of the application is designed to send updates to a Twitter account at pre-determined dates and times. Twitter, a free social networking application, includes a mobile option that allows registered users to post updates to their Twitter account and receive updates posted by other Twitter users selected by the user. The researcher decided to use HootSuite as the platform to compose and schedule the text message cues and Twitter as the

platform through which text message cues and replies would be exchanged between the researcher and participants.

The second technical challenge was successfully executing the process of (1) composing, scheduling, and sending text message cues and (2) receiving and replying to text message cues. First, the researcher created HootSuite and Twitter accounts and enabled Twitter mobile options that were linked to intervention cell phones. Second, the researcher practiced the entire intervention procedure multiple times with each intervention cell phone. It was through practicing the intervention procedures that the researcher learned that Twitter does not allow duplication of updates. In other words, Twitter does not allow a series of posts that ask the same question (e.g., Are you on task?). Therefore, the language of each text message cue and the choices provided for participant responses had to be alternated for successful execution of the cueing and recording process.

<div align="center">Social Validity Challenges</div>

Self-monitoring is highlighted throughout the research literature as a socially valid intervention that is effective in changing behavior. Preserving the benefits that make self-monitoring a practical intervention while attempting to include a digital device to enhance its procedures was challenging. A self-monitoring procedure that utilized a cell phone as the cueing and recording device could not be more complicated or time consuming than traditional self-monitoring procedures. Since traditional cueing procedures use pre-recorded audio tones on a cassette tape that typically only need to be developed once, the process for composing and

scheduling the text message cues had to be just as efficient. Additionally, recording procedures that use a cell phone had to be comparable to traditional procedures that typically employ pencil and paper for recording. As such, the researcher outlined a process to facilitate the cueing and recording procedures that required the least amount of time to implement and the least amount of effort to manage. The process requires the teacher to create HootSuite and Twitter accounts that may seem complicated and daunting to a teacher with limited computer skills or minimal social networking experience. However, once the initial set-up is completed, managing the intervention is less complicated.

Limitations

Although the CellF-Monitoring procedure appears to produce positive effects on the on–task behavior of students with high incidence disabilities, there were several limitations to the study. The limitations included (a) the low number of replications, (b) the small sample size, (c) the lack of teacher involvement, and (d) that participants used cell phones that were provided by the researcher.

The first limitation of the study was the low number of replicated effects of the intervention. Multiple-baseline designs demonstrate the effectiveness of an intervention by replicating the effects of an intervention across multiple settings, behaviors, or participants (Kazdin, 1982; Kennedy, 2005; Tawney & Gast, 1984). Although one replication is sufficient to demonstrate the effectiveness of an intervention (Kennedy, 2005), Tawney and Gast (1984) state that at least two replications are required to conclude that an intervention is effective. The

current study only replicated the effects of the intervention once making it difficult to attest to the effectiveness of the intervention.

Second, the small sample size inherent in single subject research limits generalization and external validity (Kazdin, 1982). For example, it is unknown whether the findings of the current study could be replicated with students other than those with LD and ADHD in a middle school inclusive Language Arts classroom. However, with findings from prior research (Gulchak, 2008), one could reasonably assume that self-monitoring procedures that utilize mobile technology may produce positive effects on the on-task behavior of students with high incidence disabilities in elementary self-contained settings and middle school inclusive settings.

A third limitation of the current study is that the classroom teacher was not involved in the training or implementation of the intervention limiting social validity findings. According to Horner et al. (2005), for an intervention to be socially valid, teachers must be able to implement the intervention procedures with a high level of validity. However, in this study, the researcher taught the student participants the self-monitoring procedures, composed and scheduled the text message cues, and collected all of the behavioral data. The reason for extensive researcher-control was to ensure a high level of treatment fidelity. The focus of the study was the effectiveness of an innovative self-monitoring procedure on student behavior so a high level of treatment fidelity was required and extraneous variables kept to a minimum in order for the results to be reported with confidence.

Finally, the student participants used cell phones that were provided by the researcher. The premise of using cell phones as a self-monitoring device is its prevalence among middle school students. The availability of cell phones eliminates the need for teachers to provide materials to implement the intervention and strengthens the social validity of the intervention. However, to obtain permission from the school district to conduct the study, the researcher had to provide the cell phones to the students. The cell phones provided to the students did not contain any contact information or applications, which would normally be on students' personal cell phones. As such, it is unknown if a student using his or her own cell phone for the CellF-Monitoring procedure would be more of a distraction than an intervention device.

Suggestions for Future Research

The limitations previously discussed provide many opportunities for future research. First, replication is necessary to validate the effectiveness of the CellF-Monitoring procedure. As stated earlier, effects of the CellF-Monitoring procedure were only replicated once with an additional participant in the same setting. According to Horner et al. (2005), one of the five criteria of single subject research that needs to be met for a practice to be considered evidence-based is replication of a functional relationship across subjects, researchers, and settings.

Second, future research should also determine the practicality of classroom teachers implementing the intervention to strengthen the social validity of the CellF-Monitoring procedure. Implementation should include completing the initial set-up for the cueing and recording, conducting the student training, and implementing and maintaining the intervention in

the classroom. High levels of fidelity are especially important for the initial set-up process, which may seem complicated or confusing to teachers with a limited technology skill set. By obtaining information on teachers' level of comfort in working with technology, researchers may also determine if teachers' level of comfort with technology influences the reactive effects of the CellF-Monitoring procedure.

Finally, research is necessary to determine the practicality of students using personal cell phones for the CellF-Monitoring procedure. The attraction of the CellF-Monitoring procedure is that the device needed for implementation is prevalent among middle school students. In theory, teachers can implement the intervention without the need to create or purchase additional materials. However, it is not known if the use of students' personal cell phones will make the CellF-Monitoring procedure more of a distraction than an effective intervention.

<u>Cell Phones and Education</u>

The challenge of conducting research on and using cell phones in educational settings is not without reason. Although cell phones are considered miniature computers, they are viewed as social toys and are banned from classrooms in 69% of schools across the country (Common Sense Media, 2010). Disruption, cheating, and dissemination of inappropriate pictures and text messages among students are consistently cited as reasons for banning of cell phones from classrooms (Kolb, 2009; McNeal & van't Hooft, 2006). Are the benefits of using cell phones in the classroom given as much consideration as reasons for not using them in the classroom? Have educational stakeholders taken into consideration that cell phones allow students to gather,

access, and process information inside and outside of the classroom? Or, that because of their

relatively low cost and prevalence among students regardless of race/ethnicity and social

economic status, cell phones can help level the digital playing field? Sure, cell phones may be a

distraction at times and some students may use them inappropriately; but can't the same thing

happen with a pencil? So, why not develop policies and procedures for appropriate use of cell

phones in the classroom instead of policies and procedures that prohibit their use in classrooms?

Wouldn't educators' time be better spent on finding authentic and creative ways to use cell

phones in the classroom rather than fighting cell phone use?

The battle over cell phones in the classroom is much larger than it appears. The

resistance to allowing cell phones in the classroom leads to a question about the use of

technology in education on an even grander scale. If the goal of education is to prepare students

for a competitive 21st century global market, then why are the skills and tools necessary for their

success prohibited in classrooms? It is time for the field of education to respond differently to

new and innovative technology by becoming better consumers of research and taking into

consideration any benefits of innovative technology prior to labeling it as a detriment to

education.

<div align="center">Conclusion</div>

Even with the limitations and the need for future research, the results of the current study

suggest that the CellF-Monitoring procedure produced positive effects on the on-task behavior of

the students in this study. The results of this study further validate the use of cell phones as a

self-monitoring device while maintaining the positive reactive effects documented throughout the research literature. Additionally, research demonstrating a practical research-based use for cell phones in educational settings may prompt educational stakeholders to move away from viewing cell phones as social toys and move towards viewing cell phones as what they really are - powerful mobile computers.

APPENDIX A
INSTITUTIONAL REVIEW BOARD LETTER OF APPROVAL

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: **Pena Bedesem**

Date: **April 01, 2010**

Dear Researcher:

On 04/01/2010, the IRB approved the following modification – revision to consent documents to reflect changes in participant eligibility criteria and estimated time-line for the study – to human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Using Cell Phone Technology for Self-Monitoring Procedures in Inclusive Settings
Investigator:	Pena Bedesem
IRB Number:	SBE-10-06711
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 04/01/2010 04:58:37 PM EST

Joanne Muratori

IRB Coordinator

APPENDIX B
TEACHER CONSENT DOCUMENT

University of
**Central
Florida**

EXPLANATION OF RESEARCH

Title of Project: Using Cell Phone Technology for Self-Monitoring Procedures in Inclusive Settings

Principal Investigator: Peña Lasiste Bedesem

Other Investigators: Jacqueline Rodriguez

Faculty Supervisor: Lee Cross, PhD

You have been chosen to participate in a study that is being conducted for research in conjunction with the University of Central Florida, College of Education. Your identifying information has not been shared in any way with the researcher at this time. You were chosen because you meet the criteria for this study and are being offered the opportunity to participate.

The purpose of the research is to evaluate the effects and practicality of a self-monitoring procedure that utilizes cell phones for cueing and recording on the on-task behavior of students in inclusive settings.

With your consent, student in your classroom will learn how to self-monitor his/her on-task behavior using a self-monitoring procedure that uses a cell phone. The researcher will provide the cell phone and take responsibility for any charges associated with using the cell phone as part of the intervention. At the end of the study, you will be asked to complete a social validity questionnaire to evaluate the practicality of using a cell phone to self-monitor behavior in inclusive classrooms, which will take less than 30 minutes to complete and the entire research study is expected to take 6-8 weeks.

Your name, the names of your students, and the name of your school will be kept confidential and will not be used in any report, analysis, or publication. All identifying information will be replaced with alternate names or codes. You have the right to refuse to participate and stop participating in this research study at any time.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints: Peña L. Bedesem, Doctoral Candidate, Exceptional Student Education, College of Education, (407) 928-2598 or by email at pbedesem@knights.ucf.edu; or Dr. Lee Cross, Faculty Supervisor, Department of Children, Family and Community Sciences at (407) 823-2233 or by email at lcross@mail.ucf.edu.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901.

APPENDIX C
PARENT CONSENT DOCUMENT

University of
**Central
Florida**

EXPLANATION OF RESEARCH

Title of Project: Using Cell Phone Technology for Self-Monitoring Procedures in Inclusive Settings

Principal Investigator: Peña Lasiste Bedesem

Other Investigators: Jacqueline Rodriguez

Faculty Supervisor: Lee Cross, PhD

Your child has been chosen to participate in a study that is being conducted for research in conjunction with the University of Central Florida, College of Education. Your child's identifying information has not been shared in any way with the researcher at this time. Your child was chosen because he/she meets the criteria for this study and you, as parent, are being offered the opportunity to have your child participate. Students who meet eligibility criteria for participant in the research study are those who are already identified as having an emotional or behavioral disorder or at risk for being identified as having an emotional or behavioral disorder as defined by the state of Florida guidelines.

The purpose of the research is to evaluate the effects and practicality of a self-monitoring procedure that utilizes cell phones for cueing and recording on the on-task behavior of students in inclusive settings.

With your consent, your child will learn how to self-monitor his/her on-task behavior in three inclusive academic classrooms using a self-monitoring procedure that uses a cell phone. The researcher will provide the cell phone and take responsibility for any charges associated with using the cell phone as part of the intervention. At the end of the study, you and your child will be asked to complete a social validity questionnaire to evaluate the practicality of using a cell phone to self-monitor behavior in inclusive classrooms, which will take less than 30 minutes to complete and the entire research study is expected to take 6-8 weeks in the designated classrooms.

Your child's name, the names of his/her teachers, and the name of your child's school will be kept confidential and will not be used in any report, analysis, or publication. All identifying information will be replaced with alternate names or codes.

Your child will be allowed the right to refuse to participate and stop participating in this research study at any time. Your child will be reminded of this prior to the self-monitoring training and prior to beginning the self-monitoring procedure in each classroom.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints: Peña L. Bedesem, Doctoral Candidate, Exceptional Student Education, College of Education, (407) 928-2598 or by email at pbedesem@knights.ucf.edu; or Dr. Lee Cross, Faculty Supervisor, Department of Children, Family and Community Sciences at (407) 823-2233 or by email at lcross@mail.ucf.edu.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901.

Name of student: _____

Parent's name (printed): _____

Parent's signature: _____

Date: _____

APPENDIX D
SOCIAL VALIDITY QUESTIONNAIRES

Social Validity Questionnaire
(Teacher)

	Yes	No
1. Do you own a cell phone?	☐	☐
2. If yes, do you use the text message function of your phone?	☐	☐
3. If yes, do you use the text message function of your cell phone at least once a day?	☐	☐

	1-5	6-10	11-15	16-20	21+
4. If yes, estimate the number of text messages you send on average each day.	☐	☐	☐	☐	☐

	Yes	No
5. Self-monitoring that utilizes a cell phone would be an acceptable intervention to increase on-task behavior.	☐	☐
6. I like the procedures used in the intervention.	☐	☐
7. The student's behavior problem warranted the use of this intervention.	☐	☐
8. Using the cell phone as the intervention device did not distract the student.	☐	☐
9. The student using the cell phone as the intervention device did not distract other students in the classroom.	☐	☐
10. Most teachers would find this intervention appropriate for students with challenging behaviors in inclusive settings.	☐	☐
11. I would suggest the use of this intervention to other teachers.	☐	☐
12. Most teachers would find this intervention appropriate for increasing on-task behavior.	☐	☐
13. I would be willing to use this intervention in the classroom setting.	☐	☐
14. Overall, the intervention was beneficial for the student.	☐	☐

Social Validity Questionnaire
(Student)

		Yes	No
1.	Do you own a cell phone?	☐	☐
2.	If yes, do you use the text message function of your phone?	Yes ☐	No ☐
3.	If yes, do you use the text message function of your cell phone at least once a day?	Yes ☐	No ☐

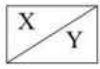|		1-5	6-10	11-15	16-20	21+
4.	If yes, estimate the number of text messages you send on average each day.	☐	☐	☐	☐	☐

5. What did you like about using the cell phone to self-monitor your behavior?

6. What did you dislike about using the cell phone to self-monitor your behavior?

APPENDIX E
OBSERVATION RECORDING SHEET

Date:	Observer:

On-Task Behavior:

(a) in seat (buttocks were on the seat of the chair unless given permission, student's feet do not have to be on the floor, all four feet of chair do not have to be on the floor)

(b) quiet, unless given permission to speak (not talking, whispering, or mouthing to others without permission)

(c) not disrupting others (passing a note, touching another student's body or possessions)

(d) following teacher directions

(e) eyes on task, teacher, or speaker

$$\boxed{\begin{array}{c} X \\ \diagdown \\ Y \end{array}}$$ = Interval during which text message cue was sent

X = Researcher Observation
Y = Student Participant Response

Start Time:	End Time:		Task/Assignment:								
Minutes 1-10 (30s intervals)			1	2	3	4	5	6	7	8	9	10
P1	B	I									
P2	B	I									

Minutes 11-20			11	12	13	14	15	16	17	18	19	20
P1	B	I										
P2	B	I										

	Total # of 1's	Total # of 0's	Percent of Time On Task	Student Part/Researcher Agreement
P1				
P2				

APPENDIX F
TEACHER PROTOCOLS

Specific Teacher Protocols During Each Experimental Class

Please DO:

1. Conduct class as usual

2. Continue with any classroom management plan established prior to the research study

Please DO NOT:

1. Prompt the participant more than usual to get on-task or stay on-task

2. Provide specific praise or external reinforcement above and beyond what was provided to the participant during baseline or generally provided to other students in the class

3. Dismiss the participant from any classroom management plan established prior to the research study

4. Exclude the student from disciplinary action due to inappropriate classroom behavior

5. Lower behavioral or academic expectations for the participant

6. Use the intervention and/or device as reinforcers

APPENDIX G
CELLF-MONITORING TRAINING PRESENTATION

Three Steps to CellF-Monitoring

Ms. Bedesem

University of Central Florida & Jackson Middle
School, Orange County Public Schools

Three Steps to CellF-Monitoring: Step 1

The target behavior is *on-task behavior*

What does *on-task behavior* look and/or sound like?

1. In your seat
2. Quiet
3. Not disrupting others
4. Following teacher directions
5. Eyes on the assignment, teacher, or speaker

Three Steps to CellF-Monitoring: Step 1

Why do I think *being on task* is important?

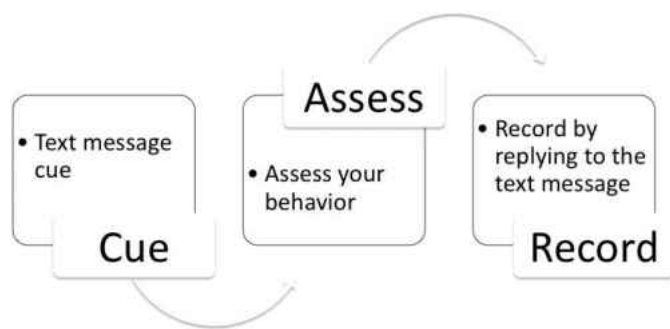1. *To get good grades!*
2. *To learn valuable information!*

Why do you think *being on task* is important?

Peña L. Bedesem
University of Central Florida
pbedesem@knights.ucf.edu

Three Steps to CellF-Monitoring: Step 2

Assess

- Text message cue

- Assess your behavior

- Record by replying to the text message

Cue

Record

Peña L. Bedesem
University of Central Florida
pbedesem@knights.ucf.edu

Three Steps to CellF-Monitoring: Step 2

Cell Phone Rules

1. Keep cell phone on vibrate mode
2. Do not take cell phone out of pocket/desk unless text message cue is received
3. Reply to text message cue as quickly as possible (5 seconds or less)
4. Return cell phone to pocket/desk immediately after responding to text message cue
5. Do not flaunt or acknowledge that you are able to use the cell phone in class/school

3/11/10

Peña L. Bedesem
University of Central Florida
pbedesem@knights.ucf.edu

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Three Steps to CellF-Monitoring: Step 2

Now, I am going to show you the entire CellF-Monitoring procedure!

Pay special attention to

1. My phone being on vibrate
2. How quickly I read and respond to the text message cue

3/11/10

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Three Steps to CellF-Monitoring: Step 3

Now you get to 'play' with the cell phone and practice the CellF-Monitoring procedure

1. You will wait to receive a new text message

2. You will read and respond to the text message

3. You will repeat the procedure when instructed

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Three Steps to CellF-Monitoring: Step 3

1. Turn the phone on, off, and then on again

2. Put the cell phone on vibrate mode

3. Put the cell phone in your pocket

4. Once you receive the text message, go to the text message inbox

5. Open and read the unread text message

6. Reply with a "1" to the text message

7. Wait for a new text message to be received

8. Repeat steps 3 and 4

9. Reply with a "0" to the text message

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Congratulations,
you are now
ready to

CellF-Monitor
your own
behavior!!

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APPENDIX H
CELLF-MONITORING TRAINING CHECKLIST

Three Steps to CellF-Monitoring
Training Checklist

Step 1: Introduce Target Behavior

☐ Identify the target behavior

☐ Define the target behavior

☐ Demonstrate examples and nonexamples of the target behavior

☐ Provide an example of why the target behavior is important

☐ Have the student brainstorm 2-4 additional reasons the target behavior is importa

Step 2: Introduce CellF-Monitoring Procedure

☐ Define the purpose of each component of the self-monitoring procedure

    o Cue

    o Assess

    o Record

☐ Explain how the cell phone is used in the CellF-Monitoring procedure

    o Text Message Cue

    o Text Message Reply to Record

☐ Explain Cell Phone Rules

Step 3: Provide Practice

☐ Model the entire CellF-Monitoring procedure

☐ Allow students to 'play' with the cell phone

    o Turn the cell phone off/on

    o Put the cell phone on vibrate mode

    o Access text message inbox

    o Open and read an unread text message cue

    o Reply to a text message cue

☐ Allow students to practice the entire CellF-Monitoring procedure

    o Guided practice

    o Independent practice

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