

Spring 4-5-2018

## **Case Study: Teacher Perception of a Web-Based Professional Development Training on Research-Based Instructional Strategies and Behavioral Interventions for Teaching ADHD Students**

Joy L. Runnels  
Concordia University - Portland, joyr96@gmail.com

Follow this and additional works at: [https://digitalcommons.csp.edu/cup\\_commons\\_grad\\_edd](https://digitalcommons.csp.edu/cup_commons_grad_edd)



Part of the [Education Commons](#)

---

### **Recommended Citation**

Runnels, J. L. (2018). *Case Study: Teacher Perception of a Web-Based Professional Development Training on Research-Based Instructional Strategies and Behavioral Interventions for Teaching ADHD Students* (Thesis, Concordia University, St. Paul). Retrieved from [https://digitalcommons.csp.edu/cup\\_commons\\_grad\\_edd/165](https://digitalcommons.csp.edu/cup_commons_grad_edd/165)

This Dissertation is brought to you for free and open access by the Concordia University Portland Graduate Research at DigitalCommons@CSP. It has been accepted for inclusion in CUP Ed.D. Dissertations by an authorized administrator of DigitalCommons@CSP. For more information, please contact [digitalcommons@csp.edu](mailto:digitalcommons@csp.edu).

Spring 4-5-2018

# Case Study: Teacher Perception of a Web-Based Professional Development Training on Research-Based Instructional Strategies and Behavioral Interventions for Teaching ADHD Students

Joy L. Runnels

*Concordia University - Portland*

Follow this and additional works at: <https://commons.cu-portland.edu/edudissertations>



Part of the [Education Commons](#)

---

## CU Commons Citation

Runnels, Joy L., "Case Study: Teacher Perception of a Web-Based Professional Development Training on Research-Based Instructional Strategies and Behavioral Interventions for Teaching ADHD Students" (2018). *Ed.D. Dissertations*. 121.

<https://commons.cu-portland.edu/edudissertations/121>

This Open Access Dissertation is brought to you for free and open access by the Graduate Theses & Dissertations at CU Commons. It has been accepted for inclusion in Ed.D. Dissertations by an authorized administrator of CU Commons. For more information, please contact [libraryadmin@cu-portland.edu](mailto:libraryadmin@cu-portland.edu).

Concordia University–Portland

College of Education

Doctorate of Education Program

WE, THE UNDERSIGNED MEMBERS OF THE DISSERTATION COMMITTEE  
CERTIFY THAT WE HAVE READ AND APPROVE THE DISSERTATION OF

Joy LaVon Runnels

CANDIDATE FOR THE DEGREE OF DOCTOR OF EDUCATION

Sally Evans, Ed.D., Faculty Chair Dissertation Committee

Yvonne McCastle, Ed.D., Content Specialist

Andrea M. Wilson, Ph.D., Content Reader

ACCEPTED BY

Joe Mannion, Ed.D.  
Provost, Concordia University, Portland

Sheryl Reinisch, Ed.D.  
Dean, College of Education, Concordia University, Portland

Marty A. Bullis, Ph.D.  
Director of Doctoral Studies, Concordia University, Portland

Case Study: Teacher Perception of a Web-Based Professional Development Training  
on Research-Based Instructional Strategies and Behavioral Interventions for  
Teaching ADHD Students

Joy LaVon Runnels  
Concordia University–Portland  
College of Education

Dissertation submitted to the Faculty of the College of Education  
in partial fulfillment of the requirements for the degree of  
Doctor of Education in  
Transformational Leadership

Sally Evans, Ed.D., Faculty Chair Dissertation Committee  
Yvonne McCastle, Ed.D., Content Specialist  
Andrea M. Wilson, Ph.D., Content Reader

Concordia University–Portland

2018

## **Abstract**

Classroom teachers face challenges in the classroom when meeting the learning and behavioral needs of students diagnosed with Attention-Deficit/ Hyperactivity Disorder (ADHD). To help teachers work through these challenges, a web-based professional development training was implemented at a K–5 elementary school on research-based instructional interventions and behavioral strategies for teaching students with ADHD. The purpose of the study was to: (a) examine teacher perception of the learning from the professional development training on ADHD, (b) identify how teachers used the research-based strategies learned in instruction, and (c) identify trends in teacher knowledge of ADHD after the professional development. Six teachers participated in the web-based professional development. After the training, teachers implemented research-based academic interventions and behavioral strategies with students in their classes diagnosed with ADHD. Findings revealed that after participating in the web-based professional development on ADHD, teacher participants overall knowledge of ADHD increased slightly as measured by the pre- and post-KADDS survey. Teacher participants also indicated that for some of their students with ADHD, the implementation of the research-based strategies resulted in a higher occurrence of on-task behaviors, along with increased attention and motivation. Plus, there was a decrease in disruptive behaviors with some of their students with ADHD. Additionally, teacher participants perceived the web-based professional development was interactive, purposeful, and applicable to their needs in making instructional decisions when teaching students with ADHD.

*Keywords:* ADHD instructional interventions, Attention-deficit/hyperactivity disorder (ADHD), executive functions (EFs), web-based professional development, professional development (PD)

## **Dedication**

This dissertation is dedicated to my mother, Glenn Runnels, a veteran educator of 38 years, and my father, Roy Runnels, who instilled in all of my sisters and me at an early age the importance of having a college education. We were admonished to obtain a college degree and to “go as far as you can with it.” This dissertation is also dedicated to my sister, Dr. Ratonia Runnels, the first one in our family to receive a Ph.D. Big sister #3, you set the bar high and inspired me to take a leap of faith and perseverance to further my education and make an impact in the field of education.

Most importantly, this dissertation is dedicated to educators all over the world who are passionate about making a difference in the lives of students each day. Our greatest joys come from our most challenging moments in the classroom. I propose to all educators to continue learning and growing your craft to improve the educational outcomes of all children.

“For I know the plans I have for you,” declares the Lord, “plans to prosper you and not to harm you, plans to give you hope and a future. Then you will call on me and come and pray to me, and I will listen to you. You will seek me and find me when you seek me with all your heart.” (Jeremiah 29:11–14 NIV)

## **Acknowledgments**

There is no way I would have made it through this doctoral process without the grace and mercy of God.

A sincere appreciation is expressed to my parents for setting the tone at an early age that education is the key to unlocking a successful future. Thank you for your continuous prayers, support, and understanding as many family functions were missed as I tackled the completion of this dissertation.

To my three sisters Kim, Trina, and Ratonia and my only son, Khyleal; thank you for your support and humor as I worked diligently through this journey. Thank you for your encouragement and for keeping me sane when I felt like I was losing it and this was not worth the fight.

I would like to express my heartfelt gratitude to my administration team, all of my coworkers and friends for supporting me and expressing encouraging words to keep me inspired to reach this goal.

It is with great pleasure that I thank Dr. Wilson and Dr. McCastle for their helpful insights as I complete this dissertation.

Finally, to my committee chairperson, Dr. Sally Evans: thank you for your tireless commitment to pushing me through this complex process and late-night revisions to ensure a quality piece of work is published. Thank you for your patience and assistance. It is greatly appreciated.

## Table of Contents

|   |     |
|---|-----|
| Abstract .....                                    | ii  |
| Dedication .....                                  | iii |
| Acknowledgements .....                            | iv  |
| List of Tables .....                              | xi  |
| Chapter 1: Introduction to the Study .....        | 1   |
| Statement of the Problem .....                    | 2   |
| Purpose and Significance of the Study .....       | 3   |
| Research Questions .....                          | 5   |
| Research Design .....                             | 5   |
| Data Instruments and Analysis .....               | 8   |
| Trustworthiness .....                             | 9   |
| Validity .....                                    | 10  |
| Limitations, Assumptions, and Delimitations ..... | 11  |
| Limitations .....                                 | 11  |
| Assumptions .....                                 | 11  |
| Delimitations .....                               | 12  |
| Definition of Key Terms .....                     | 13  |
| Chapter 1: Summary .....                          | 15  |
| Chapter 2: Literature Review .....                | 17  |
| Conceptual Framework .....                        | 21  |
| Professional Learning Communities .....           | 22  |
| Professional Development .....                    | 22  |
| Web-Based Professional Development .....          | 24  |



|  |    |
|--|----|
| Active Learning/Reflective Practice .....                  | 26 |
| Collective/Collaborative Participation.....                | 28 |
| Coherence .....  | 29 |
| Duration .....   | 29 |
| Review of Research Literature.....                         | 30 |
| Classroom Behavior of Children With ADHD.....              | 31 |
| Executive Functions (EFs).....                             | 34 |
| Teacher Knowledge of ADHD .....                            | 34 |
| Teacher Self-Efficacy .....                                | 35 |
| Inclusive Education.....                                   | 37 |
| Web-Based Professional Development on ADHD .....           | 39 |
| Intervention Strategies for ADHD .....                     | 40 |
| Instructional Interventions .....                          | 40 |
| Incidental learning .....                                  | 41 |
| Computer-assisted instruction/educational technology ..... | 41 |
| Self-verbalization.....                                    | 42 |
| Hands-on learning.....                                     | 43 |
| Peer tutor.....  | 43 |
| Teacher think-aloud .....                                  | 44 |
| Visualization .....  | 46 |
| Behavioral Interventions.....                              | 47 |
| Self-monitoring.....                                       | 48 |
| Self-regulation.....                                       | 49 |
| Daily Report Card (DRC) .....                              | 49 |

|   |    |
|---|----|
| Methodological Literature .....                         | 50 |
| Review of Methodological Issues .....                   | 52 |
| Synthesis of Research Findings .....                    | 53 |
| Critique of Previous Research .....                     | 55 |
| Chapter 2 Summary .....                                 | 57 |
| Chapter 3: Methodology .....                            | 60 |
| Statement of the Problem.....                           | 61 |
| Purpose and Significance of the Study .....             | 62 |
| Research Questions .....                                | 64 |
| Research Design.....                                    | 64 |
| Study Site .....  | 66 |
| Population and Sampling Method.....                     | 66 |
| Study Procedures .....                                  | 67 |
| Web-Based Professional Development Implementation ..... | 68 |
| Web-Based Professional Development Modules.....         | 69 |
| Data Instruments .....                                  | 71 |
| KADDS .....   | 72 |
| Professional Development Open-ended Task Modules .....  | 73 |
| Professional Development Survey .....                   | 74 |
| Documentation .....                                     | 75 |
| Teacher Interviews.....                                 | 76 |
| Data Collection and Analysis.....                       | 77 |
| KADDS.....  | 78 |
| Professional Development Open-ended Task Modules .....  | 78 |

|  |    |
|--|----|
| Professional Development Survey .....                      | 78 |
| Documentation .....  | 79 |
| Teacher Interviews .....                                   | 80 |
| Validation.....  | 80 |
| Triangulation.....   | 81 |
| Trustworthiness.....                                       | 81 |
| Confirmability.....  | 82 |
| Credibility .....  | 83 |
| Transferability.....                                       | 83 |
| Expected Findings.....                                     | 84 |
| Ethical Issues .....                                       | 84 |
| Limitations, Delimitations, and Assumptions of Study ..... | 85 |
| Limitations .....  | 85 |
| Delimitations.....   | 87 |
| Assumptions.....   | 87 |
| Chapter 3 Summary .....                                    | 87 |
| Chapter 4: Data Findings and Results.....                  | 89 |
| Research Questions.....                                    | 90 |
| Description of the Sample.....                             | 90 |
| KADDS Survey Findings .....                                | 92 |
| Web-Based Professional Development Survey Findings .....   | 94 |
| Emerging Themes .....                                      | 95 |
| Theme 1: Academic Challenges .....                         | 95 |
| Reading/Writing challenges.....                            | 96 |

|   |     |
|---|-----|
| Student frustration.....                    | 97  |
| Task completion.....                        | 97  |
| Theme 2: Teacher Beliefs .....              | 98  |
| Awareness .....                             | 98  |
| Teacher past experiences .....              | 99  |
| Assumptions and Misconceptions.....         | 100 |
| Theme 3: Positive Teacher Interactions..... | 101 |
| Feeling supported.....                      | 101 |
| Student confidence.....                     | 102 |
| Student motivation .....                    | 103 |
| Theme 4: Teacher Efficacy .....             | 103 |
| Disruptive behavior.....                    | 103 |
| Teacher frustration .....                   | 106 |
| Theme 5: Differentiating Instruction .....  | 107 |
| Research Question Findings .....            | 109 |
| Research Question 1 .....                   | 109 |
| Survey Findings .....                       | 109 |
| Teacher Reflection Findings .....           | 110 |
| Research Question 2 .....                   | 112 |
| Research Question 3 .....                   | 118 |
| Chapter 4 Summary .....                     | 119 |
| Chapter 5: Discussion and Conclusion .....  | 120 |
| Summary of the Results .....                | 121 |
| Discussion of the Results .....             | 122 |

|  |     |
|--|-----|
| Research Question 1 .....  | 123 |
| Research Question 2 .....  | 125 |
| Instructional Strategies.....                                      | 125 |
| Behavioral Strategies .....  | 129 |
| Research Question 3 .....  | 132 |
| Discussion of the Results in Relation to the Literature.....       | 134 |
| Limitations .....  | 140 |
| Implication of the Results for Practices, Policy, and Theory ..... | 141 |
| Implication of the Results for Practice.....                       | 141 |
| Implication of the Results for Policy .....                        | 143 |
| Implication of the Results for Theory .....                        | 144 |
| Recommendations for Further Research.....                          | 145 |
| Conclusion .....   | 147 |
| References.....  | 149 |
| Appendix A: Web-Based PD Outline .....                             | 172 |
| Appendix B: Web-Based PD Online Survey .....                       | 174 |
| Appendix C: Checklist Monitoring Tool .....                        | 176 |
| Appendix D: Case Study Timeline .....                              | 178 |
| Appendix E: Semi-Structured Interview Questions.....               | 179 |
| Appendix F: KADDS Subscale Percentage of Responses.....            | 180 |
| Appendix G: Web-Based PD Survey Data .....                         | 184 |
| Appendix H: Web-Based PD Survey Open-Ended Responses.....          | 185 |
| Appendix I: Web-Based PD Modules Open-ended Responses .....        | 187 |
| Appendix J: Teacher Participant Consent Form .....                 | 200 |

|  |     |
|--|-----|
| Appendix K: Statement of Original Work ..... | 202 |
|--|-----|

## List of Tables

|  |     |
|--|-----|
| Table 1 <i>Characteristics of ADHD</i> .....                                 | 18  |
| Table 2 <i>Web-Based Professional Development Content Modules</i> .....      | 71  |
| Table 3 <i>Demographic Characteristics of Participants</i> .....             | 91  |
| Table 4 <i>Summary of pre and post-KADDS Overall Knowledge of ADHD</i> ..... | 92  |
| Table 5 <i>Pre and post-KADDS Subscales Percentage of Responses</i> .....    | 94  |
| Table 6 <i>KADDS: General Knowledge</i> .....                                | 180 |
| Table 7 <i>KADDS: Symptoms and Diagnosis</i> .....                           | 182 |
| Table 8 <i>KADDS: Treatment</i> .....  | 183 |
| Table 9 <i>Web-Based PD Survey Data of Participants' Responses</i> .....     | 184 |
| Table 10 <i>Web-Based PD Survey Open-Ended Responses</i> .....               | 185 |
| Table 11 <i>Web-Based PD Module 4 Final Task Responses</i> .....             | 199 |

## **Chapter 1: Introduction to the Study**

Attention Deficit/ Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder seen in children as early as the age of five (National Institute of Mental Health, 2016). The symptoms of ADHD are often associated with disruptive classroom behavior, which causes frequent disciplinary conduct referrals at school and behavioral referrals to school psychologists (Harrison et al., 2013). Symptoms of ADHD consist of inattention, hyperactivity, and impulsivity exhibited in children in a structured setting, such as the classroom (American Psychiatric Association: DSM-5, 2013). In addition, ADHD symptoms adversely affect executive functions (EFs) over time by hindering the ability for one to successfully self-manage their behavior and impulsive actions. Executive function skills are the mental ability to manage oneself such as, self-awareness, inhibition and interference, nonverbal and verbal working memory, emotional- motivation, planning and problem-solving, and self-regulation (Barkley, 2002, 2012). Furthermore, without proper training or pedagogy on teaching students with ADHD, teachers may acquire negative perceptions of ADHD that influence how they interact with students that have ADHD and their learning success in the classroom (Blotnicky-Gallant, Martin, McGonnell, & Corkum, 2014; Bradshaw & Kamal, 2013).

Teachers that lack understanding of ADHD perceive students with ADHD as being lazy, uninterested in learning, defiant, or come from a negative home environment (Bradshaw & Kamal, 2013). It is important for teachers to understand that ADHD is not an act of defiance or intentional lack of self-control, but a neurological or neurodevelopmental disorder of the brain that affects how a student learns and conducts their behavior. Due to the growing research on lack of teacher knowledge of ADHD across the nation, it is imperative that teachers are provided adequate training on ADHD to meet the educational and behavioral needs of students



with ADHD that can lead to improved academic success and behavior (Barkley, 2016; Bradshaw & Kamal, 2013; DuPaul & White, 2006; Guerra et al., 2017; Martinussen, Tannock, & Chaban, 2011; Sutherland, Denny, & Phillop, 2005; Visser, Holbrook, Danielson, & Bitsko, 2015). Moreover, teachers that attain instructional practices that are relative to students with ADHD can have a positive influence on how the teacher builds a relationship and how they differentiate instruction to accommodate EFs deficits in students that have ADHD (Guerra, Tiwan, Das, Vela, & Shama, 2017).

### **Statement of the Problem**

ADHD behaviors such as inattention and hyperactivity cause disruptions and learning challenges in the classroom and many teachers are lacking the knowledge of research-based strategies for teaching students with ADHD. Teachers struggle with addressing the cognitive weaknesses and managing disruptive behaviors that leads to poor academic performance of students with ADHD. Unfortunately, research has shown that there is limited professional development (PD) for educators who teach students with ADHD (Barkley, 2016; Bradshaw & Kamal, 2013; DuPaul & White, 2006; Guerra et al., 2017; Martinussen et al., 2011; Sutherland et al., 2005; Visser et al., 2015). Also, teacher preparation programs and district PD training for teachers to acquire knowledge of instructional skills and interventions for teaching students with ADHD have been limited (Barkley, 2016; DuPaul & White, 2006; Visser et al., 2015).

Moreover, many teachers are lacking understanding of ADHD and interventions for managing behaviors affected by ADHD are more inclined to face daily struggles in their classroom instruction and negatively affect teacher self-efficacy. Teacher's self-efficacy is negatively affected by the lack of ADHD knowledge and how to differentiate instruction and manage disruptive behaviors of students with ADHD. As a result, opportunities for teachers to

partake in professional development should be re-examined and increased to allow sufficient support of the unique learning needs of students with ADHD. The problem on which this study focuses is that teachers lack knowledge of research-based instructional and behavioral strategies for teaching students with ADHD. Based on the review of two elementary study sites and survey of teachers' concerns about instructional needs and support for teaching students with ADHD, a web-based PD specifically focused on ADHD was created to address instructional and behavioral concerns of students with ADHD.

### **Purpose and Significance of the Study**

The purpose of this single case study is: (a) to examine teacher perception of the learning from the web-based PD training on ADHD, (b) identify how teachers used the research-based strategies learned in instruction, and (c) to identify trends in teacher knowledge of ADHD before and after the web-based PD training. Teachers at the elementary study sites expressed concerns about the frequent occurrences of off-task behaviors and disruptions from students with ADHD in their classrooms while they continue to teach. Teacher methods used in their classrooms to manage the challenging symptoms that are associated with ADHD included non-altered instructional techniques, shortened tasks, preferential seating, isolation, or even removal from the classroom setting. Regardless of any prescribed medications used to mitigate the symptoms, teachers still saw familiar strands of academic struggle and inappropriate conduct that heightened during structured instructional blocks. Although teachers at the elementary study sites expressed frustration in dealing with the continuous disruptions, they still had a desire to find the “right way” to help students with ADHD be successful in learning.

For the above reasons, a web-based PD training, *Teaching Students with ADHD: Research-based Instructional and Behavioral Strategies Web-Based Professional Development*, was created by the researcher, a former instructional specialist and classroom teacher of 10 years. The web-based PD addresses the lack of general education pre-service and in-service training to acquire knowledge of ADHD and interventions to help meet the instructional and behavioral needs of students with ADHD. The use of a web-based PD for teachers have increased over the years and now the most efficient platform for providing PD to educators (Waheed, Salami, Ali, & Dahlam, 2011). By utilizing a web-based PD, teachers benefit from a virtual environment to share resources, personal experiences, engage in inquiry learning, reflective practice, asynchronous, and synchronous chats (Beach, 2012; Cuthell, 2008; Kao, Wu & Tsai, 2011; Rampai & Sopeerak, 2011). Furthermore, employing a collaborative web-based approach influences teachers to share background experiences, best practices, and ideas that may be supportive of each other in differentiating instruction and improving the academic and behavioral performance of students with ADHD.

For this research study, implementing a web-based PD on ADHD gives teachers the opportunity to enhance their knowledge about ADHD and learn various research-based best practices for teaching students with ADHD and help manage their behavior. The instructional interventions and behavioral strategies used in the web-based PD are research-based and have been implemented across the world and in various learning institutions with diverse demographics of students. These methods were found to be effective in some cases for students with ADHD (Barley, n.d.; Barkley & Knouse, 2010; Barkley, 2012; Barry & Messer, 2003; Clarfield & Stoner, 2005; Diamond & Lee, 2011; DuPaul, Weyandt, & Janusis, 2011; Harrison et al., 2013; Mautone, DuPaul, & Jitendra, 2005; Trout, Lienemann, Reid, & Epstein, 2007). The

PD modules are based on findings in the literature of research-based instructional and behavioral practices for working with students identified as ADHD or exhibit characteristics of ADHD (Atkins, Graczyk, Frazier, & Abdul-Adil, 2003; Bryk & Schneider, 2002; Daley & Birchwood, 2009; Dupaul, Wyandt, & Janusis, 2011; Lasky et al., 2016; Murray, Rabinar, Schulte, & Newitt, 2008; Owens, Holdaway, Zoromski, Evans, & Himawan, 2012; Raggi & Chronis 2006; Rogers, 1995). A description of the web-based PD is outlined as shown in Appendix A.

### **Research Questions**

The research questions for the study are as follows:

1. What is the perception of teachers concerning the learning from the professional development training on ADHD?
2. How did teachers use the research-based strategies learned in the professional development?
3. What were the trends noticed in teacher level of knowledge as indicated in the KADDS survey before and after the professional development training?

### **Research Design**

Case studies are commonly used by scientists and researchers to test theories and gather an in-depth understanding of a single case or program and to develop a theory about several subjects (Gustafasson, 2017). Yin (2009) describes case study research as the study of a case within a real-life setting, an inquiry approach, and a comprehensive research strategy. A case study approach is chosen to examine a case with clear limitations, where the researcher explores a problem and an in-depth understanding conveyed from examining the case (Creswell, 2013). In addition, case studies are useful for assessing programs when they are unique, implemented in

a new setting or unpredictable environment, or when an outcome is unique and warrants further investigation (Albright, Pitney, Roberts, & Zicarelli, 1998).

In a single case study approach, the researcher explores individuals, organizations, or programs using a variety of detailed, in-depth data sources (Creswell, 2003; Yin, 2003). The case may consist of an individual, several individuals, a program, and an event or activity. A single case study approach is used in this study to examine the impact of the web-based PD initiative for teachers of students with ADHD and how the research-based strategies learned from the PD are implemented in instruction with students that have ADHD.

Additionally, a sampling approach is also critical in a case study approach. There are three sampling techniques applied in a case study method: random, purposive, and convenience. Purposive sampling is conducted when the researcher is studying a specific phenomenon and wants to confirm examples of it presented in the study. Through this process, individuals are selected because they can add purposeful value and understanding to the problem and phenomenon of the study (Creswell, 2013). For this single case study, due to a limited sample population, purposive sampling is used to select second through fifth-grade teachers of students with ADHD from two elementary campus study sites to participate in the web-based PD initiative.

Data collection in single case studies mainly includes multiple sources of information such as observations, interviews, archived records, participant observations, documentation, and physical artifacts (Albright et al., 1998; Creswell, 2013; Yin, 2009). In addition, interview protocols in case studies also range from structured questionnaires, semi-structured interviews, and completely unstructured interviews (Albright et al., 1998). Albright and colleagues (1998) emphasized that the utilization of the semi-structured protocol yields comparable data from all of

the respondents and gives an opportunity for discourse in ideas or areas seen as unique. A semi-structured interview is used for this single case study with the understanding that there may be times where the conversation may stray from the semi-structured interview questions if appropriate as an extension to the study and the participant's experience during the study. The semi-structured interviews facilitate in learning about the perception of the participants, their experiences participating in the web-based PD, and implementation of research-based strategies when working with students that have ADHD. Additionally, the semi-structured interviews provide further confirmation of the participants' perceptions of the web-based PD and the research-based strategies implemented when teaching students with ADHD.

Data collection in case studies answers the questions of who, what, when, where, and why (Albright et al., 1998). For this single case study, data sources are derived from a pre- and post-KADDS survey, an online PD development survey, semi-structured interviews, documentation, and the PD modules open-ended task questions. The pre- and post-KADDS surveys are used to seek trends in teacher participants' scores on knowledge of ADHD and its symptoms, in addition to identifying common misconceptions of ADHD. The web-based PD survey provides data on the participants' perception of the PD. For documentation, the checklist monitoring tool supports in validating and supplementing evidence from other sources, such as the teacher interviews, the PD modules open-ended task questions, and the KADDS survey.

Data analysis in case studies can vary from a holistic analysis or embedded analysis (Creswell, 2013). Case study data analysis is based on examining, categorizing, and organizing evidence to evaluate whether or not the evidence corroborates with the study. The preferred strategy for analysis is descriptive statements that summarize the themes of the study, and have shaped the data collection (Rowley, 2002). Common data analysis strategies in case studies

consist of a descriptive analysis of the case, identifying themes, as well as cross-case themes (Creswell, 2013). For this single case study, descriptive statistics are used to describe and summarize the data collected from the surveys. In addition, constant comparison method is used to analyze the data collected from the semi-structured interviews, open-ended survey responses, and the PD modules open-ended task responses.

In the final phase of case study research is the development of a case study report that produces a comprehensive, detailed description of what occurred, the context in which it happened, and from multiple perspectives (Albright et al., 1998). The case study report should ultimately be a thick description of accurate recount and interpretation of events relative to the study (Albright et al., 1998; Creswell, 2013; & Stake, 1995). In developing the case study report, two key questions should be kept in mind: What are the key findings? What does the reader need to know? (Albright et al., 1998). The data findings present a clear description of steps taken to perform the study, clear explanation of the information and data collected, in which the reader will be able to see the findings are supported by the data (Albright et al., 1998). Once all data is collected and analyzed, findings of data from the case study are developed and presented in Chapter 5

### **Data Instruments and Analysis**

The data collection instruments for this single case study was comprised of surveys, semi-structured interviews, documentation, and the PD modules open-ended task questions. The process of triangulation between the various data sources is used to confirm and validate findings. Two procedures were used to analyze the data gathered from this single case study: descriptive statistics and the constant comparison method. The data of teacher participants' responses to the pre- and post-KADDS survey is used to identify trends in participant responses.

Further, the data provide a foundation of what the participants know, don't know, or have misconceptions about ADHD before participating in the web-based PD content modules and after completing the web-based PD.

Qualitative data such as interviews, open-ended responses within the PD survey, and the PD modules open-ended tasks responses are analyzed using the constant comparison method for coding of responses. The constant comparison method incorporates comparing incidents and integrating categories (Glaser & Strauss, 1967 as cited in Kolb, 2012). The process of constant comparison involves systematic data collection, coding, and analysis of theoretical sampling to develop a theory that supports the data. This type of coding approach allows the researcher to attain and develop concepts from the data by simultaneously coding and analyzing (Corbin & Strauss, 2008). Researchers Glaser and Strauss suggest the constant comparison method is beneficial to case studies because of the constant comparisons that bring about theory from raw data (Kolb, 2012).

Additionally, descriptive details are collected and instructional practices are analyzed to identify indicators of the phenomenon and apply thematic codes accordingly. Interviews and open-ended survey responses are also analyzed and edited for accuracy. Transcripts of interviews, open-ended survey responses, and the PD modules open-ended task responses are read and analyzed using a line-by-line coding to take note of themes and phenomena that are present. All data sources and study information are stored in a secure place and all study documentation is kept confidential.

### **Trustworthiness**

Researchers Lincoln and Guba have identified trustworthiness as criteria that provide rigor in research (Lincoln & Guba, 1985 as cited in Shenton, 2004). The credibility or



confidence in the truth of the findings of this study is established by two methods: triangulation and member checking. Triangulation is the use of varied data sources used to develop an understanding of phenomena and increase validity and credibility (Guba, 1981; Patton, 1999). Member checking involves communicating with teacher participants of the study to check the transcription accuracy of their interview response. In an effort to increase accuracy of responses, teacher participants' responses to interviews are repeated to ensure what was verbalized was intended to be spoken.

In this study, findings are presented with in-depth descriptions of the phenomena to ensure transferability and confirmability. Providing detailed descriptions of study results help convey the experiences that took part in the study. Additionally, confirmability is exhibited by ensuring the qualitative findings are the result of the teacher participants' experiences and ideas and not preferences of the researcher. Dependability is also derived from the evaluation of integrated data collection, data analysis, and conclusions (Graff, 2014).

### **Validity**

The combination of methods, such as triangulation methods, compliments each other and helps bring an increase in validity where there may be deficiencies in other data collection methods (Brewer & Hunter, 1989; Denzin, 1978; Guba, 1981; Patton, 1999). Triangulation is also used as a qualitative research strategy to test validity through the conjunction of information from a variety of sources. Data triangulation consists of data collection from a variety of sources to have several perspectives and increase credibility (Guba, 1981; Patton, 1999). For the purpose of this study, data source triangulation is used in a collection of data from surveys, documentation, semi-structured interviews, and the PD modules open-ended task questions. Survey instruments are distributed online and completed anonymously by participants with the

assurance that responses would remain private. Thus, participants can respond truthfully without any influence of others. In all, this single case study addresses appropriate methods in participant selection in conjunction with addressing confidentiality concerns, and removal of research bias.

### **Limitations, Assumptions, and Delimitations**

#### **Limitations**

One of the limitations of this study was the use of purposive sampling that limited the single case study to second through fifth-grade teachers of two elementary campuses in the same district with similar demographics. Additionally, the elementary campus study sites student demographics, years of teaching experience, and teacher knowledge of ADHD could impart difficulty in making generalizations of any findings to other elementary schools. Due to the small number of second through fifth-grade teachers of students that are documented with being diagnosed with ADHD, a small sample size also was a limitation to this single case study.

#### **Assumptions**

The desired outcomes of the web-based PD initiative on learning research-based instructional and behavioral strategies for teachers of students with ADHD are grounded in several assumptions or philosophical beliefs. For example, one assumption of the web-based PD initiative is that all teachers who instruct students with ADHD can benefit from participating in a web-based PD by collaboration of experiences, shared knowledge, and reflective practice in learning about ADHD. Another assumption of the initiative is that teachers will have a positive shift in how they perceive students diagnosed with ADHD. Finally, it is assumed that the web-based PD initiative on teaching students with ADHD will improve teachers' knowledge of

ADHD, which can also transfer to improving the academic and behavior performance of students with ADHD.

### **Delimitations**

First, this study is delimited to second through fifth-grade elementary teachers who are currently teaching students diagnosed with ADHD. Secondly, the teachers also must meet the following criteria to qualify to be part of the study. The criteria used in the single case study includes: (a) teaches second, third, fourth, or fifth grade in one of the two school sites for the study; (b) currently has one or more years of teaching experience; (c) instructs students in their classroom diagnosed with ADHD in the fall semester of September 2017; and (4) did not have any PD training on ADHD prior to the start of the current school year. Additionally, teacher willingness to participate in the training and use strategies from the training in their instruction with ADHD students was a delimitation. Second through fifth-grade teachers are selected because research indicates students with ADHD poor academic performance is prevalent in reading and math by the second grade (Siqueira & Gurge-Giannetti, 2011; Thompson, 2014).

Thirdly, the study is delimited to surveys, semi-structured interviews, the PD modules task questions, and documentation. The semi-structured surveys developed are distributed online and completed anonymously by participants with the assurance that responses will remain private and secure. Surveys are utilized to gain a more in-depth perspective and to measure the impact or effectiveness of the intervention. The process of triangulation between various qualitative data sources is used to confirm and validate findings. Triangulation and member checking are implemented to establish the credibility or confidence in the truth of the findings of this study. In all, these data sources were enough to gain an in-depth perspective and to measure the impact or effectiveness of the web-based PD training initiative.

## Definition of Key Terms

The following definitions describe the background information used to identify the concepts under investigation.

*Achievement Gap* occurs when there is a significant difference in academic performance between groups of students based on success measures such as student grades, standardized test scores, dropout rates, and college completion rates (National Center for Education Statistics - NCES, 2015).

*Attention-Deficit Hyperactivity Disorder (ADHD)* is brain disorder marked by an ongoing pattern of inattention and hyperactivity-impulsivity that interferes with functioning or development (National Institute of Mental Health, 2016). Inattention is referred to difficulty in sustaining focus and is disorganized; hyperactivity is seen as constantly moving about, excessive fidgeting, tapping, or talking at inappropriate times; and impulsivity related to making hasty actions or decisions without thinking first about the action (National Institute of Mental Health, 2016).

*Behavioral Intervention* is an intervention plan developed and implemented to prevent or reduce behavior issues by addressing the cause of the behavior (Tucker, 2014).

*Conduct Disorder (CD)* is a consistent pattern of disruptive behavior and compliance with rules (The Diagnostic and Statistical Manual of Mental Disorders 5th edition; American Psychiatric Association, 2013).

*Emotional Behavior Disorder (EBD)* refers to a student who exhibits one or more emotionally-based characteristics of sufficient duration, frequency, and intensity to the extent it significantly interferes with their educational performance and results in special education services as necessary (IDEA, 2004).

*Every Student Succeeds Act (ESSA)* is a new education law that replaced the No Child Left Behind Act (NCLB), which ensures that every child achieves (U.S. Department of Education, 2010).

*Executive Functions (EFs)* are brain-based cognitive skills that aid in critical thinking and self-regulation (Barkley, 2012).

*Individuals with Disability Education Act (IDEA)* is a law ensuring children with disabilities throughout the nation are provided the same opportunities and non-disabled children and have the rights to receive a free appropriate public education. (IDEA, 2004).

*Inclusive education* is the opportunity for students with disabilities not to be isolated or removed from their primary classroom setting and learn together with their non-disabled peers in general education classrooms (U.S. Department of Education, 2010).

*Instructional Interventions* are strategic instructional methods that are implemented based on formal and informal assessment data including the student's strengths and individual needs to be successful in the educational environment (U.S. Department of Education, 2006).

*Learning Disability/Disorder (LD)* is the difficulty in learning that affects the way one learns, retain information, and/or process information (National Institute of Child Health and Human Development, 2016).

*Opposition Defiant Disorder (ODD)* is a pattern of emotional moods exhibited toward others that consist of angry/irritable, argumentative/defiant behavior, or vindictiveness. (APA, 2013).

*Professional Learning Communities (PLC)* is an approach to foster collaborative, practice-based professional learning amongst teachers within a work environment (Pirtle & Tobia, 2014).

*Section 504* is a federal law aimed to protect the rights of individuals with disabilities. Under Section 504, FAPE consists of the provision of regular or special education and related aids and services designed to meet the student's individual educational needs as adequately as the needs of nondisabled students are met (U.S. Department of Education, 2010).

*Teacher Self-efficacy* is teacher reflection of self in regards to being capable of producing desired learning outcomes (Tschannen-Moran & Woolfolk Hoy, 2001).

*Special Education* is broadly defined as meeting the academic, physical, cognitive and social-emotional needs by providing specialized instruction to children faced with one or more disabilities (IDEA, 2004).

*Web-Based Professional Development* refers to a professional development provided via the web following asynchronous or synchronous approach and may include videos, visuals, interactive, readings, assessments, and discussions (Irby, 2015).

## **Chapter 1: Summary**

Opportunities for pre-service and in-service training for general education teachers to gain knowledge of instructional skills and interventions for teaching students with ADHD are limited (Barkley, 2016; DuPaul & White, 2006; Visser et al., 2015). The lack of ADHD training for teachers has become a concern as the number of students with ADHD has increased over the last 10 years (Barkley, 2016; Barnett, Corkum, & Elik, 2012; Bos, Nahmias, & Urban, 1997; Froelich, Breuer, Doepfner, & Amonn, 2012; Visser et al., 2015; Zentall & Javorsky, 2007). A web-based PD initiative was designed to make available to teachers, research-based instructional interventions and behavioral strategies for teaching students with ADHD. By learning effective research-based instructional methods, teachers can become equipped with the essential

knowledge and skills to help improve the learning and behavior of students who are diagnosed with ADHD.

The purpose of the completed single case study was: (a) to examine teacher perception of the learning from the web-based PD training on ADHD; (b) identify how teachers used the research-based strategies learned in instruction; and (c) to identify trends in teacher knowledge of ADHD before and after the web-based PD training. The sample population consists of second through fifth-grade teachers of students with ADHD from two elementary campus sites of study. Various data collection tools are used that consist of semi-structured interviews, survey, documentation, and the PD modules open-ended task questions. Data analysis includes two methods: descriptive statistics and constant comparison. Presented in the next chapter is a literature review that includes discussion of effective components of quality PD trainings, research-based strategies for teaching students with ADHD, and a critique of related studies.

## Chapter 2: Literature Review

Attention-deficit hyperactivity disorder (ADHD) is a neurodevelopmental brain disorder characterized by an ongoing pattern of inattention and hyperactivity-impulsivity that interfere with the development of one to perform at their full potential (National Institute of Mental Health, 2016). ADHD causes the development of inappropriate levels of inattention, impulsivity, and hyperactivity that affects how the brain works (Barkley, 1990, 1995, 2011, 2012; National Resource Center on ADHD, 2015). According to the Center for Disease Control and Preventative (CDC, 2017), ADHD is a common behavioral condition affecting 11% of school-age children and seen in children as early as seven years of age. Research indicates that 75% of students with ADHD continue to experience symptoms into adulthood (Visser, Danielson, Bitsko, 2015).

The two characteristics of ADHD, as outlined in *The Diagnostic and Statistical Manual of Mental Disorders* (5th edition; American Psychiatric Association [APA], 2013), are inattentiveness combined with hyperactive-impulsive behaviors (American Psychiatric Association, 2013). The National Institute of Mental Health (2016) defines inattention in children with ADHD as having difficulty in sustaining focus and being disorganized. Hyperactivity in students with ADHD is seen as constantly moving about, excessive fidgeting, tapping, or talking at inappropriate times (National Institute of Mental Health, 2016). Impulsivity in children with ADHD is the nature of making unexpected actions or decisions without thinking first about the action (National Institute of Mental Health, 2016). A more detailed description of the characteristics of predominately inattentive and hyperactive-impulsive symptoms of ADHD are shown in Table 1.



Table 1

*Characteristics of ADHD*

| ADHD predominantly inattentive<br>(occurs more often or frequently)  | ADHD predominantly hyperactive-impulsive<br>(occurs more often or frequently)   |
|--|---|
| <ul style="list-style-type: none"> <li>• failure to give close attention to details or make careless mistakes</li> <li>• difficulty sustaining attention</li> <li>• does not appear to listen</li> <li>• struggles to follow through with instruction</li> <li>• difficulty with organization</li> <li>• avoids or dislikes tasks requiring sustained mental effort</li> <li>• loses things</li> <li>• easily distracted</li> <li>• forgetful in daily activities</li> </ul> | <ul style="list-style-type: none"> <li>• fidgets with hands or feet or squirms in chair</li> <li>• difficulty remaining seated</li> <li>• runs about or climbs excessively in children</li> <li>• difficulty engaging in activities quietly acts as if driven by a motor</li> <li>• talks excessively</li> <li>• blurts out answers before questions have been completed</li> <li>• difficulty waiting or taking turns</li> <li>• interrupts or intrudes upon others</li> </ul> |

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington D.C.: American Psychiatric Association.

Research continues to confirm young students with ADHD are increasingly at risk to experience adversity in various areas (Barkley, 2002; Daley & Birchwood, 2009; Ogg et al., 2013; Raggi & Chronis, 2006; Russell, Ford, Rosenberg, & Kelly, 2014; Steiner, Sheldrick, Gotthelf, & Perrin, 2011). Academic failure or delays, social interaction, oppositional defiant disorder (ODD), inconsistent school performance, prolonged feelings of guilt and anxiety, and substance abuse leading into teenage years are all common challenges for children with ADHD (Barkley, n.d.; APA, 2013; CHADD, n.d.). Children with ADHD are found to underperform compared to their counterparts, achieving lower vocationally and experience interpersonal difficulties as they transition from adolescence to adulthood (Daley & Birchwood, 2009; Ogg et al., 2013; Raggi & Chronis, 2006; Russell et al., 2014; Steiner, et al., 2011). As academic challenges increase among adolescents with ADHD into college years, follow-up studies of clinical samples show nearly 40% of youth with ADHD are more likely to dropout of secondary school in 9th through 12th grades, while nearly 10% do not graduate from college (Barkley, 2002).

Moreover, having ADHD can affect the social behavior of students with ADHD. Some children with ADHD tend to exhibit lack of self-monitoring skills. For instance, children with ADHD are unaware of social boundaries or how their actions can provoke or affect others (Barkley, 2005; Hodgins, Cole, & Boldizar, 2000; Hoza et al., 2005). Consequently, closely 50% of adolescents with ADHD may struggle with engaging in social activities, and close to 30% may experience depression of some sort, with nearly 20% of children with ADHD developing a personality disorder (Barkley, 2002; Hoza et al., 2005). Additionally, close to 50% of children who are diagnosed with ADHD have few friends or none at all (Barkley, 2002; Hoza et al., 2005). Unfortunately, peer rejection of children with ADHD impacts the quality of friends

that some children with ADHD do have as they become teenagers, which tend to be peers that exhibit a negative reputation, such as defiant, physically and verbally aggressive, and emotionally unstable (Hodgens et al., 2000). Given the data from various follow-up studies of clinical samples, early social intervention is imperative as children with ADHD face behavioral and social challenges during their primary school years. With few opportunities for teacher competency in ADHD, meeting the behavioral and social needs of children with ADHD to be successful in the school setting will continue to be a challenge (Daley & Birchwood, 2009; Ogg et al., 2013; Raggi & Chronis, 2006; Russell et al., 2014).

Currently, the most common intervention strategy for students with ADHD is psychostimulant medication to control levels of hyperactivity, inattention, and to improve students' cognitive attention (National Resource Center on ADHD, 2015; Trout et al., 2007). Contrary to what some may believe, medication does little for the academic instructional needs for students with ADHD to comprehend and retain content (Trout et al., 2007). General education teachers may use a relatively small number of appropriate academic interventions and lack ongoing support to implement changes and refine instructional practices to meet the academic and behavioral needs of students with ADHD (Barkley, 2016; DuPaul & White, 2006; Visser et al., 2015). The academic gap between students with ADHD and without ADHD will continue to widen as opportunities for pre-service and in-service training for general education teachers to gain knowledge of instructional skills and interventions for teaching students with ADHD are limited (Barkley, 2016; DuPaul & White, 2006; Visser et al., 2015).

The literature review includes an overview of research and case studies that examine the impact web-based professional development (PD) has on increasing awareness of ADHD characteristics and implementation of effective research-based strategies for teaching students

with ADHD. The primary sources for the literature review include peer-reviewed journals, articles, and scholarly books. These primary sources provide a range of key elements that pertain to knowledge and characteristics of ADHD and academic and behavioral interventions for ADHD. Literature research of case methodology is presented to provide a rationale and validity of the method approach. Finally, the literature review concludes with a synthesis and critique of research findings relating to the current research study. Information gathered from Internet searches included ERIC, EBSCO, ProQuest, and Google Scholar. Search terms included *Attention Deficit Hyperactive Disorder/ADHD; ADHD academic interventions; ADHD behavior adolescents; daily report card; disruptive behavior; executive functions (EF); inclusion; inclusive education; intervention; children; online learning communities; professional development; professional learning communities; web-based professional development (PD).*

### **Conceptual Framework**

According to research, high-quality PD contains the following characteristics: alignment to district curriculum and state standards and assessments; purposeful content and modeling of teaching practices; active learning; collaboration; follow-up PD; and continuous feedback (DeMonte, 2013; Garet, Porter, Desimone, Birman, & Yoon, 2001; Poekert, 2012). Having a well-designed online learning community creates a platform for teachers of various background experiences to share ideas collaboratively, receive guidance, resources, and gain new knowledge within a supportive atmosphere. The conceptual framework for this study is based on PD methods that are structured to provide a collaborative learning community that engages teachers to build instructional knowledge and techniques to use in instruction and behavior intervention for students that have ADHD. The foundation that shapes the conceptual framework for this single case study is described in seven interdependent themes: professional learning

communities; high quality PD; web-based PD; active learning/reflective practice; collective/collaborative participation; coherence; and duration.

### **Professional Learning Communities**

Professional Learning Communities (PLCs) have become a common model for collaborative thinking in adult learning. Unlike traditional PD where there might be a lack of interaction amongst educators, PLCs provide an environment where educators can support one another's practices and develop a strong sense of self-efficacy while gaining and sharing new knowledge. PLCs strengthen teachers' commitment to working collaboratively with their peers and improving their instruction to meet the needs of students. PLCs are most effective when teachers engage in ongoing conversations about instruction and learning related to their daily instruction and most productive in a trusting environment (Pirtle & Tobia, 2014). Research contributes personal learning communities to having effective PD practices that create improvement in classroom instruction and an increase in teacher self-reflection and collaboration (Pirtle & Tobia, 2014; Poekert, 2012).

### **Professional Development**

Professional development (PD) plays a vital role in building teacher knowledge and raising student academic achievement. High-quality PD encompasses collaborative learning, purposeful content, follow-up, and feedback (Poekert, 2012). Collaborative PD is defined as a long-term systematic process that includes consistent opportunities and experiences that promote professional growth and development (Villegas-Reimers, 2003). By using a collaborative learning approach, teachers can acquire a deeper knowledge of their content-subject matter and student learning processes. Teachers in collaborative communities are able to share instructional strategies and brainstorm solutions to student challenges. Moreover, collaborative learning

encourages teachers to discover new ideas and instructional approaches to help make the learning relevant, engaging, and ultimately increase student achievement. Thus, collaboration is beneficial for teachers as they engage in the inquiry of learning and develop a professional network of shared learning. This collaboration provides a means to exchange of practice, knowledge, expertise, and create a support system (Butler & Schnellert, 2012).

Additionally, PD should have a focus on specific content or subject matter and instructional strategies for teachers on how to teach specific concepts and skills within the content or subject matter. There are four dimensions that should be addressed for purposeful PD content. The first dimension is improving teachers' content knowledge, general pedagogy, or teaching practices (Birman et al., 2000). In this dimension PD activities may relate to effective classroom management techniques, lesson planning that entails rigor and relevance, or grouping methods to facilitate varied learning styles of students. The second dimension entails specific teaching practices aligned to the curriculum (Birman et al., 2000). In this dimension, PD activities would relate to the teachers learning and applying the new problem-solving model to practice or learning how to teach using equivalent fractions as a strategy to add and subtract fractions.

The third dimension of purposeful PD content is having goals for student learning and improving student performance (Birman et al., 2000). The ultimate goal of teaching is to impact student learning. In this dimension PD activities would focus on improving students' conceptual understanding of a specific concept or skill. Conceptual understanding is the ability to comprehend ideas and transfer the knowledge to new situations and apply it to new contexts. For instance, inference and drawing conclusions is a critical thinking skills that children struggle to comprehend in primary and adolescent years. When children grasp the concept of making inferences and drawing conclusions they are able to think abstractly and comprehend text at a

deeper level. The student then can apply inference and drawing conclusions skills to other content areas, such as in scientific reasoning.

The fourth dimension of purposeful PD content is having an emphasis on refining teachers' understanding of how children learn (Birman et al., 2000). Learning and understanding how students learn is a vital component of PD. Many children in classrooms around the world have various learning and behavioral disorders that have a negative impact on how they learn and level of success in the classroom. Teachers must observe and understand how students learn in order to use the right instructional approaches to improve student academic performance (Birman et al., 2000). The more analytically teachers learn and understand the variation of learning differences of their students, diverse learning needs of their students can be met.

In any case, the content of PD should be targeted to directly relate to teachers so there is an increase in knowledge and skills (Birman et al., 2000) to build teaching capacity, improve their teaching practices, and increase student learning. Further, to increase teacher knowledge and student achievement, more emphasis is needed on PD content. Teachers need expanded knowledge of the content in which they teach. Teachers are able to adjust their teaching of a specific concept or skill to meet student needs when they are aware of how students learn. (Birman et al., 2000). Ultimately, as teachers improve their knowledge base of subject matter and differentiated instructional practices, they become more equipped to meet the varied needs of their students.

### **Web-Based Professional Development**

Considerable research shows online learning becoming more common in education and other career fields to incorporate pedagogy or field training (Barnett et al., 2012; Diana, 2013; Kao et al., 2011; Kinzie et al., 2006; Rampai & Sopeerak, 2011; Shannon, Snyder, &

McLaughlin, 2015; Waheed et al., 2011; Whitaker et al., 2007). As technology continuously evolves in education, it is now the most efficient platform for providing PD to educators (Waheed et al., 2011). Teachers can participate in a web-based learning at their leisure and maneuver through PD modules in the time frame suitable for their learning.

Web-based PD is found to be effective for learning about ADHD and interventions for students with ADHD. Teachers who have participated in a web-based PD as an alternative approach to face-to-face PD, perceive utilizing an online PD platform to be valuable and a practical method for intervention learning about students with ADHD (Barnett, Corkum, & Elik, 2012; Beach, 2012; Cuthell, 2008; Kao et al., 2011; Rampai & Sopeerak, 2011; Waheed et al., 2011). Furthermore, as teachers participate in more online PD and acknowledge the impact digital tools can have on learning, they are more receptive to implementing digital learning in the classroom (Beach, 2012). As classroom learning evolves into more digital learning tools, PD mechanisms must also evolve (Beach, 2012).

Another benefit of a web-based program is that it supports the learning experiences of teachers by providing flexibility in time, convenience, efficiency, feedback with follow-ups, and readily accessible materials (Cakir & Horzum, 2013; Kao & Tsai, 2009; Rakap et al., 2015). The constrained time for teaching and learning for teachers during the instructional day and after school can be a challenge and time consuming, leaving little room to participate in traditional face-to-face PD (Steiner, 2004). As a resolution to time constraints of PD, using digital mechanisms such as a web-based platform, can provide teachers the opportunity for more extensive collaboration on planning, problem-solving, developing curriculum, evaluating, assessing student learning, and teacher reflection (Beach, 2012). Web-based PD permits to meeting the needs of teachers' demanding schedules, yet still provides quality training that is



readily accessible, relevant, and less loss of time during the instructional day (Waheed et al., 2011). By utilizing a web-based PD, teachers are provided a virtual environment to share resources, personal experiences, engage in inquiry learning, reflective practice, asynchronous and synchronous chat (Beach, 2012; Cuthell, 2008; Kao et al., 2011; Rampai & Sopeerak, 2011).

Moreover, with online PD, teachers are provided the ability to post questions, comments, share ideas, and “aha” moments in regard to the PD material presented when participating in a web-based PD. Online learning environment should also support risk-taking behavior, creativity, and a collaborative platform that will ultimately enhance participant productivity (Weisberg, 2000). Integrating the use of technology offers a greater opportunity for teachers to be more participative and actively involved in the learning experience (Barnett, Corkum, & Elik, 2012; Bos et al., 1997; Diana, 2013). Essentially, a web-based PD approach allows teachers to embark upon shared understandings that lead to being empowered to tackle the instructional and learning challenges they are faced with daily in the classroom (Waheed et al., 2011).

### **Active Learning/Reflective Practice**

An integral part of effective PD is active learning and reflective practice. Sociologist Mezirow (1985), presented three kinds of adult learning: instrumental- a specific skill development; dialogic- learning collaboratively from understanding; and self-reflective- thinking about self- practices to improve what you do. Traditional teacher PD primarily reinforces instrumental and dialogic adult learning. However, incorporating self-reflection creates a process of stimulus learning, content knowledge, and classroom practice (Mezirow, 1985). Self-reflection also leads to active learning where teachers become engaged in meaningful discourse, planning, and practice (Birman et al., 2000).

There are four elements needed to provide for active learning in teacher professional development. They are observing and being observed; planning for implementation; reviewing student work; and presenting, leading, and writing (Garet et al., 2001). The four elements when incorporated in a PD training provide an atmosphere where teachers can give and receive instructional feedback, engage in reflective discussion about student learning and teaching practices, and examine the practical issues presented. In addition, PD activities not only offer the opportunity for a teacher to be an active learner as an audience participant. When the element of leading is implemented in teacher professional development, teachers are provided the opportunity to present teaching pedagogy and model instructional practices. As with the element of writing to provide active learning in teacher professional development, teachers are able to extend knowledge and skills into written work such as writing curriculum or student assessments.

To have an effective outcome in active learning, three planning stages should occur (Guskey, 2009). First, interactive activities should be strategically planned and related to purposeful content that teacher participants will engage in that improves teacher effectiveness. Second, adequate time should be provided for participants' self-reflection of experiences related to the PD content. Third, ample time for teachers to share their ideas of how to implement new instructional methods should be given (Guskey, 2009). Further, PD models that feature active learning, often have teachers participate in the same style of learning they are designing for their students by using real examples of curriculum, student work, and instruction.

By providing authentic learning experiences for teachers, a connection is formed between the content knowledge and daily classroom practices of teachers. Ultimately, teachers' knowledge and skills are enhanced when teacher PD has targeted content, and an opportunity for

developing and modeling of teaching practices (Garet et al., 2001). Implementing a web-based PD provides an opportunity for teachers to be actively engaged in meaningful discourse and influence the use of research-based instructional and behavioral methods for teaching students with ADHD (Waheed, Salami, Ali, & Dahlan, 2011).

### **Collective /Collaborative Participation**

Current research suggested PD may be more useful when teachers participate collectively (Birman et al., 2000; Douglass, Carter, Smith, & Killins, 2015). Collective participation incorporates teacher participants from the same department, subject or grade, the opportunity to interact in active learning. The advantage of collective participation is that it provides a discussion of concepts and problems teachers may encounter with new knowledge content (Birman et al., 2000; Douglass et al., 2015). Key characteristics of high-performing educational systems have been found to include 15-25 hours a week of teacher collaborative learning and planning for continuous quality improvement (Darling-Hammond, 2014). Unfortunately, most teachers in traditional school settings work directly with students throughout the school day and are only given a standard 45 to 55 minutes for a planning period each day, averaging 4.5 to 5 hours of planning within a week.

Moreover, collective participation is known to be beneficial for the campus culture and shared knowledge by creating time for shared dialogue and planning among colleagues for implementing new practices. It provides concrete and emotional support to teachers when implementing new practices while fostering an organizational culture that is geared to changing practices in the targeted area (Douglass et al., 2015). Formal and informal opportunities for shared reflective practice and observational modeling that reinforces new learning are also benefits of collective participation (Douglass et al., 2015). For this single case study, a core

component of the web-based PD is collaboration and collective participation. In using a web-based PD design, teacher participants can act as a learning community where knowledge is learned together, new skills are applied and supported in the classroom, and become more self-reflective.

### **Coherence**

The term coherence as it relates to PD is defined as shared understandings regarding teaching and learning, in which effective teaching practices and learning opportunities are provided to teachers to improve the learning outcomes of all students (Grossman, Hammerness, McDonald, & Ronfeldt, 2008). PD that fosters coherence provides purposeful content that enables the teacher to make a connection between the PD activity and the reality of instructional practices presented in the classroom (Virtue, Main, & Pendergast, 2015). The coherence of PD is evaluated in three ways: extends on the schema of teacher knowledge; emphasizes content alignment with national, state and local standards, frameworks and assessments; and supports of developing and sustaining professional communication to improve teacher pedagogy and instructional practices (Garet et al., 2001). When given more opportunities for coherent teacher learning and development that is connected to teachers' daily practices, teachers are more likely to improve their knowledge and skills (Birman et al., 2000). Ultimately, PD activities and programs should align with the organizational goals to influence commitment to the learning and implementations of the PD content.

### **Duration**

As related to PD, duration is the depth or significant timing needed to enact positive teacher change. The duration of PD should be efficient and sufficient enough to engage learners through practice, implementation, and reflection. Research has shown that PD activities given

over a sustained duration that focuses on the content matter, offers an opportunity for teachers to connection and share experiences, and provide additional opportunities for active learning improve teacher effectiveness and student outcomes (Birman et al., 2000; Shahi & Azhar, 2014; Virtue et al., 2015). Studies vary in the number of hours of participation found to be associated with changes in instruction, as well as in the period over which teachers were engaged (Desimone, 2009; Kennedy, 1999; Supovitz & Turner, 2000). However, effective PD initiatives engage teachers in learning by building and going more in-depth of the content over extended amount of time, rather than in one session (Darling-Hammond, Hyler, & Gardner, 2019). Most importantly, for a PD to be effective, the duration of the PD should allow more time for teacher participants to apply PD content to curriculum, student learning, instructional methods, and self-reflection of practices. For the purpose of this single case study, the duration of the web-based PD is over a two-week time span. The time span will permit continued PD that builds on a cycle of teacher implementation of learned content, reflection, and feedback on a more informal level.

## **Review of Research Literature and Methodological Literature**

### **Research Literature**

In 2015, Congress passed the Every Student Succeeds Act (ESSA), requiring that all students in America be taught to high academic standards that will prepare them to succeed in college and careers. The ESSA was created to help maintain accountability by guaranteeing that when students academically fall behind, steps are taken to help students and schools improve. For districts, campuses, and teachers to continuously meet the demands of quality education, the foundations of effective teaching through relevant and interactive PD must be consistently provided to teachers. The literature review provides research of five key elements that have been researched and plays a vital role in a teacher's competency level when teaching students with

ADHD, teacher knowledge and skills in the area of ADHD, teacher self-efficacy, inclusive education, web-based PD modules, and ADHD instructional and behavioral intervention strategies.

### **Classroom Behavior of Children With ADHD**

The symptoms of ADHD can cause a child to exhibit a lack of sustained focus on a task. Consequently, it becomes a challenge in identifying significant details that help progress the learning of the tasks. Likewise, impulsive behavior can hinder academic performance by making careless errors. Impulsive behavior causes careless thinking or responses and time to process information to achieve an accurate or reasonable answer is shortened (Harrison et al., 2013). On the other hand, students with ADHD are likely to put forth more effort in subject areas with high levels of creativity and physical movement because it is interesting and entertaining for them (Harrison et al., 2013).

Children with ADHD encounter various challenges within a school setting due to behavioral issues, such as physical and verbal aggression, seeking attention from the teacher, time-outs, and noncompliance (Harrison et al., 2013; Junod et al., 2006; Steiner, Sheldrick, Frenette, Rene & Perrin, 2014). Behaviors such as anxiety, worry, attention problems, making of careless errors, rushing through assignments, and self-doubt ultimately manifest into challenges with academics (Harrison et al., 2013). Research indicates children with ADHD fail to achieve at the academic level of their peers and the academic level predicted by their age or IQ (Harrison et al., 2013; Steiner et al., 2014). Furthermore, school-aged children with ADHD are found to be consistently off-task during whole-group instruction and exhibit significantly lower on-task time spans when compared to peers that are non-ADHD (Imeraj et al., 2013; Kofler, Rapport, & Alderson, 2008). Adolescent students diagnosed with ADHD and experience academic

problems are also more likely to receive special education services and counseling services (Daley & Birchwood, 2009; Imeraj et al., 2013). However, not all students with ADHD may experience academic deficits that warrant special education services.

It is common for ADHD and Emotional Behavioral Disorder (EBD) to overlap amongst children who exhibit behavioral disorders. EBD is a federal category of education disability, and students who may qualify under the EBD category may exhibit social, personal and educational issues (IDEA, 2004). Under the Individuals with Disabilities Education Act of 2004 (IDEA, 2004), a student with a learning disability or behavioral condition that adversely affects their educational performance over an extended duration can classify as a student with an EBD. The Council for Exceptional Children shared that children categorized with an EBD may exhibit similar characteristics of ADHD, such as hyperactivity, aggressive behavior, social withdrawal, poor coping skills, and learning difficulties.

The disruptive behavior seen in children with EBD and hyperactive behavior seen in children with ADHD are found to be the most common problem behaviors observed in general education classrooms as perceived by general education teachers (Harrison et al., 2013; Junod, DuPaul, Jitendra, Volpe, & Cleary, 2006). Externalizing behaviors that are commonly demonstrated by children with EBD such as physical aggression or disobeying rules often results in exclusion from the learning environment (Junod et. al., 2006). In addition, adolescents with EBD struggle with interpersonal relationships and encounter low academic achievement (DiCroce et al., 2016). However, unlike most adolescents with ADHD who receive education in a general education setting, adolescents categorized with an EBD receive their education apart from the general education setting more than 60% of the day (Cullinan & Sabornine, 2004).

Researchers have examined the relationship between the academic performance and students served as EBD or exhibit characteristics of ADHD and concluded that even with a more restrictive classroom setting, academic deficits heightened (Cullinan & Sabornine, 2004; DiCroce et al., 2016; Wiley, Siperstein, Bountress, Forness, & Brigham, 2008). Students with ADHD, who also have an EBD, exhibit disruptive behavior which results in conduct referrals and in some cases expulsion from school. Sixty-five percent of students categorized with an EBD have a disruptive behavior disorder diagnosis and 42% of disruptive EBDs exhibit characteristics for ADHD (Garland et al., 2001). Unfortunately, behavioral patterns of children with EBD or ADHD can intensify through the adolescent years without any classroom deregulation, leading to a negative effect in academics and can result in negative actions outside of school (Grisso, 2008).

Moreover, approximately 15% to 20% of the population in juvenile justice facilities suffer from EBD, which is 10 times higher than their representation in the community (Grisso, 2008). Additionally, youth with mental disorders between the ages of 16-21 are likely to be arrested for criminal activity, unruly or unmanageable behavior with authority (Grisso, 2008). Long-term epidemiological follow-up studies indicate male adolescents with ADHD encounter increased risk of criminal activity as adults, anti-social behavior in early and mid-adulthood, and an increase in academic and cognitive challenges (Babinski, Hartsough, & Lambert, 1999; Farrington, 1991; Mannuzza, Klein, Abikoff, & Moulton, 2004; Mannuzza, Klein, Abikoff, & Moulton, 2008). Recognizing the high percentage of adolescents with ADHD that encounter academic and behavioral challenges, essential social and emotional skills should be provided that helps a child understand their feelings and behaviors and apply this knowledge to their interactions and relationships (Harrison et al., 2013).



## **Executive Functions (EFs)**

Executive functioning (EF) skills are the mental processes that permit one to focus, organize, apply decision-making skills, problem-solving, and have self-control (Barkley, 2012). Adolescents and adults with ADHD experience difficulties in implementing EFs, which may warrant the need for support in accommodating EFs shortfalls to be successful in managing their behavior, and daily endeavors (Barkley, 2012). Deficits in EFs are noted in student behaviors such as planning and response inhibitions, memory skills, and inattentiveness that affects the academic performance (Armstrong, 1999; Diamond & Lee, 2011; Johnson & Reid, 2011). Further, high levels of ADHD characteristics, such as inattentiveness and problem behaviors along with low levels of EFs affect academic performance (Biederman et al., 2004). As a solution to accommodating EF deficits, a prosthetic environment should be created by making information external (Barkley, 2011). Using mnemonic devices or concrete examples help to accommodate academic learning and provide the extra help needed to stay focused and experience happiness in well-being when diagnosed with ADHD.

## **Teacher Knowledge of ADHD**

Effective instructional practices and individualized behavior management are needed to support students with ADHD individualized learning. Research reveals general education teachers have misconceptions about the ADHD disorder and negative perceptions toward students with ADHD (Hepperlen, Clay, Henly, & Barke, 2002; Jones & Tuscano, 2008; Ohan, Cormier, Hepp, Visser, & Strain, 2008; Youssef, Hutchinson, & Yousseff, 2015). As might be expected, special education teachers are more likely to receive moderate to extensive in-service training in ADHD than general education teachers (Martinussen, Tannock, & Chaban, 2011).

Additionally, research findings indicate 41% percent of the special education teachers receive little training in ADHD (Martinussen et al., 2011).

Moreover, lack of administrative support was a variable found contributing to teachers' lack of opportunity for training on ADHD. Administrators should also take part in attending quality PD on ADHD to understand how the symptoms of ADHD influence teacher instruction, classroom environment, and the academic performance of a student with ADHD (Guerra et al., 2017). The learning of ADHD should be a partnership between teachers and administrators to ensure adequate resources are provided to teachers that will improve teacher instruction with students that have ADHD and school counseling services that can assist students with ADHD in self-regulating their behavior. Teacher training programs, districts, and behavioral programs must work together to design strategic and targeted PD to meet the needs of educators who teach children with behavioral and academic challenges.(Martinussen et al., 2011; Sutherland et al., 2005).

Without adequate training and ongoing PD of best practices for teaching students with ADHD, teachers will continue to struggle with classroom management and providing effective instructional practices for students who exhibit characteristics of ADHD and EBD (Sutherland et al., 2005). The gap will continue to widen to reach academic improvement, which lessens the meaning of a "highly" qualified teacher and "quality" instruction. As teachers lack competency in providing quality instruction and classroom management, student achievement is negatively impacted and can also lead to teacher attrition (Sutherland, Denny, & Philip, 2005).

### **Teacher Self-Efficacy**

Teacher efficacy is the confidence a teacher has in the ability to enhance student learning (Hoy, 2000). Teachers develop a sense of efficacy by mastery of experience, social persuasion,

and involvement in professional learning communities (Prothero, 2008). Lack of teacher preparation in ADHD can negatively affect teacher self-efficacy in teaching students with ADHD. Aggressive behavior patterns are likely to increase with children who have ADHD and lead to developing negative relationships with their teachers (Sutherland, Lewis-Palmer, Stichter, & Morgan, 2008). Consequently, this can result in teachers having a negative or frustrating attitude towards students with ADHD and teacher attrition. Teachers who lack knowledge of ADHD due to the unpreparedness of best instructional practices for students with ADHD and poor academic performance experience a heightened level of stress and frustration as they struggle to work with students that are ADHD (Bradshaw & Kamal, 2013). Furthermore, a contributor to low teacher self-efficacy are challenges in understanding the mind and behaviors of a student with ADHD. As a result, teachers tend to reprimand students with ADHD more as a consequence for exhibiting EF deficits, such as organization, attentiveness, self-control, and working memory skills (Bradshaw & Kamal, 2013).

However, shifts in perception and attitude towards ADHD can occur when teachers are more knowledgeable about the disorder and gain tools to help students accommodate their EF deficits. In addition, when provided training related to ADHD instructional and behavioral strategies, teachers acquire helpful behaviors and become more confident in their teaching practices when working with students who are ADHD (Hepperlen et al., 2002; Jones & Tusciano, 2008; Ohan et al., 2008; Youssef et al., 2015). Moreover, to bring about a positive shift in classroom behavior of students with ADHD, the classroom instructional variables that are needed should be identified and taken into consideration before implementation of any instructional or behavioral intervention (Sutherland et al., 2008). The classroom instructional variables are the instructional characteristics a teacher chooses to implement to address

instructional concerns that can indirectly shape the perception of a student. Classroom instructional variables can consist of the following: teacher's instructional delivery, learning practices, classroom management, classroom culture, classroom setting, classroom rules and consequences. For instance, if a teacher is seeking to change the occurrence of a student's off-task behavior, it is important for the teacher to first examine their instructional delivery and student learning practices. Additionally, classroom culture could be examined to determine if it is a possible reason why the student fails to stay attentive to the learning task (Sutherland et al., 2008). By identifying classroom and behavior variables earlier with the application of targeted interventions, teachers may have increased confidence in their capability to successfully manage and improve the behavior and academic performance of students with ADHD.

### **Inclusive Education**

Section 504 and the Education of Children with Disabilities Act (ECDA) covers students diagnosed with ADHD. This act requires that students with disabilities be provided appropriate educational services designed to meet the individual needs of such students to the same extent as the needs of students without disabilities (U.S. Department of Education, 2010). An appropriate education for a student with a disability is described in The U.S. Department of Education under Section 504 regulations. The 504 regulations include guidelines for education in regular classes with supplementary services, and special education and related services. Under Section 504, students with disabilities, such as ADHD are permitted to have accommodations and specialized educational services.

In addition to the lack of instructional strategies for ADHD students, teachers also lack the knowledge and skills to work with students with a disability in an inclusive classroom (Gehrke & Cocchiarella, 2013; Linklater & Florian, 2010; Srivastava, De Boer, & Pijl, 2015).

Teachers feel students who receive inclusive education are better served from the special education teacher who is assumed to be more equipped to provide instructional and behavioral interventions to meet the disability needs of students (Lee, Yeung, Tracey, & Barker, 2015). The primary focus of special education teachers is to provide optimal instruction through accommodations and modifications to meet the needs of learners who have behavioral, mental, or physical disabilities (Lee et al., 2015; Linklater & Florian, 2010; Srivastava et al., 2015). Students with disabilities (96%) spend part of their day in a general education classroom (U.S. Department of Education, 2007). This makes it essential for general education teachers to receive in-service training on best practices for teaching students with learning disabilities.

Unlike general education teachers, special education teachers receive specific training for special needs students. The training for special education teachers trainings consists of areas in intellectual disability (ID), physical disability, visual and hearing impairment, autism spectrum disorder (ASD), ADHD, speech and language, and gifted and talented (Lee et al., 2015; Linklater & Florian, 2010; Srivastava et al., 2015). Unfortunately, certain disabilities in the classroom such as ADHD, dyslexia, intellectual disability, and ASD are overlooked by teachers due to their inadequacy of how to differentiate instruction to accommodate the child's disability. Too often students with these related behaviors appear to look mainstream and have fallen through the cracks by not receiving special education services or differentiated instruction to meet their unique needs due to teachers being unaware of the disability characteristics (Srivastava et al., 2015).

When teachers become knowledgeable and observant of comprehensive strategies to support various learning and behavioral disabilities, the willingness to engage with these students is more receptive. Teachers of students with disabilities should have a reciprocal triangular

relationship between three elements: knowing, doing, and believing (Hawkins, Florian, & Rouse, 2008). As general education and special education teachers work collaboratively, the knowledge they share can be implemented in the practice of inclusion with confidence and belief that inclusive education is beneficial and effective for learners with disabilities (Hawkins et al., 2008). For teaching practices to develop, extensive in-service training must occur that provide in-depth information about inclusion for students with disabilities, with an emphasis on services to accommodate the student's academic or behavioral disabilities to reach academic success.

### **Web-Based Professional Development on ADHD**

There are benefits for using a web-based interactive tool to provide PD to teachers at various proficiency levels, grade levels, and subject content areas (Kinzie et al., 2006; Whitaker et al., 2007). For example, a web-based PD can provide instant access to a wealth of educational resources, global collaboration, and asynchronous learning. PD conducted online provides an opportunity for teachers to work at a pace conducive to their learning (Kinzie et al., 2006; Whitaker et al., 2007). Additionally, web-based PD is a convenient platform that is readily accessible for teachers to acquire learning in various forms related to ADHD. Studies have indicated that utilizing presentations, web links, and discussion board activities are beneficial for teachers to engage in collaborative learning of knowledge of ADHD and best practices for teaching students with ADHD (Barnett et al., 2012). Furthermore, a web-based PD platform provides an open forum of communication for teachers to share their experiences of teaching students diagnosed with ADHD, which can lead to developing a mutual support system and instructional toolbox of valuable information related to ADHD (Froelich et al., 2012).

For instance, My Teaching Partner (MTP) is a web-based interactive tool that is designed to deliver a targeted program of PD for teaching quality and curricular to large audiences.

Eighty-eight percent of teachers who participated in the MTP web-based program perceived the site to be effective in adding value to their PD experience and efficient (Kinzie et al., 2006). In a like manner, a web-based interactive platform was implemented to improve special education teachers' competencies, knowledge, and skills of autism to meet state autism endorsement requirements. Research findings indicate the web-based PD interactive platform positively impacted special education teacher practices and sustained knowledge of autism and self-efficacy (Rakap, Jones, & Emery, 2015). Additionally, previous studies have found that a web-based PD is more effective when there is meticulous planning for technical challenges before implementation as well as cognizance of the participant's level of technology and technology-efficacy (Cakir & Horzum, 2013; Kao & Tsai, 2009; Whitaker et al., 2007).

Timing is also a vital issue with most in-service training given during school on average is 5 to 8 hours, after school or weekends on an average of 2 hours (Barnett et al., 2012). As a resolution to minimize the time teachers are taken out of the classroom, web-based interventions should be used (Barnett et al., 2012). Utilizing online PD can also lessen teachers' reluctance to be absent from their class and lose instruction to partake in face-to-face PD, especially if it is training that exceeds one day. Ultimately, using a web-based PD with collaboration technology as a learning tool enables participants to transfer knowledge, work as a team, expand creativity and innovation, minimizes time out of the classroom, improve instructional strategies, and improve their professional image (Barnett et al., 2012; Waheed et al., 2011).

## **Intervention Strategies for ADHD**

### **Instructional Interventions**

The impulsive behavior of students with ADHD can interrupt the academic learning and classroom environment. Psychostimulant medication and behavioral interventions can lead to an

improvement in classroom behavior, but the use of treatment has a minimal effect on academic performance for students with ADHD (Dupaul et al., 2011; Dupaul & Stoner, 2003). The symptoms of ADHD adversely affect EFs over time hindering the ability for one to successfully self-manage (Barkley, 2012). The types of EFs are: planning and problem-solving, inhibition and interference, nonverbal and verbal working memory, emotional and motivation self-regulation, and self-awareness (Barkley, 2012). For teachers to be successful in working with students that are ADHD, teachers should not focus on the disruptive nature of their externalized behaviors but focus more on the cognitive processes essential to their learning, which are the EF deficits (Dupaul et al., 2004).

**Incidental learning.** Incidental learning is learning that takes place unknowingly. Using a holistic approach such as incidental learning can help build EF capacity in students with ADHD (Johnson & Reid, 2011) and divert seemingly off-task attention back to the central task. Incidental learning can be used to accommodate behaviors of EF deficits such as off-task behavior, unable to focus or pay attention to a central task, and often being redirected due to misbehavior. For example, during a class read aloud a student becomes easily distracted by the sudden sound of an ambulance while the teacher continues to read aloud a story about a little boy that becomes lost while walking alone to the park. Instead of redirecting the student for being distracted, the teacher uses the sound of the ambulance and integrates it with the story as an ambulance on its way to find the lost little boy. When incidental learning is strategically utilized, it becomes a central component, and the child is focused back on the lesson (Armstrong, 1999).

**Computer-assisted instruction/educational technology.** Computer-Assisted Instruction (CAI) involves delivering instructional content through the use of computer technology. The instruction is delivered in smaller portions, using multiple sensory modalities,



and with immediate feedback (Raggi & Chronis, 2006). The use of educational technology is a high stimulation that increases the attention span for children and adults with ADHD (Dupaul et al., 2011; Raggi & Chronis, 2006). The advantage of learning through technology is the ability to receive instant feedback. The involvement with the technology is highly stimulating for students with ADHD and can help in controlling their arousing stimuli. In addition to the use of technology as a means for supporting the learning of students with ADHD, computer-assisted instruction (CAI) is also used to accommodate for EF deficits in students with ADHD.

CAI cannot only help students with ADHD sustain attention, but also allow teachers to develop individualized activities for students with ADHD that increase confidence, motivation, and actively involved in the learning process (Dupaul et al., 2011; Raggi & Chronis, 2006). In addition, CAI is found effective in improving the academic performance of ADHD students in reading and math (Barkley & Knouse, 2010; Clarfield & Stoner, 2005; Diamond & Lee, 2011; Dupaul et al., 2011; Mautone et al., 2005). Not only is CAI beneficial for instructional intervention, but it also found to reduce off-task behavior with a significant improvement in inattentive symptoms for students with ADHD (Barkley & Knouse, 2010; Rabiner, Murray, Skinner, & Malone, 2009).

**Self-verbalization.** It is important to identify and plan instructional interventions with the understanding of how students with ADHD think and process information. According to Raggi and Chronis (2006), cognitive strategies such as teacher model thinking aloud, self-talk or self-verbalization, visualization, and feedback is cognitive therapy for students with ADHD. Some teachers may perceive “self-talk” as an off-task behavior. However, it can help a child with ADHD process or think through a given task by verbalizing their thoughts and working at their pace leading to better comprehension. The cognitive strategy of visualization can be more

effective for students with ADHD who are more introverted and uncomfortable with talking aloud or talking to themselves (Raggi & Chronis, 2006). For example, having a student to visualize or imagine events of a narrative or physical characteristic of a character within a story will allow the student to connect and engage with the story to sustain the attention of reading.

**Hands-on learning.** Hands-on activities provide opportunities for tactile learning as a creative expression to convey learning or thought process positively and limiting negative behavior (Lasky et al., 2016). Research suggests hands-on learning to be effective in sustaining attention and building engagement for ADHD student learners (Lasky et al., 2016; Raggi & Chronis 2006). Likewise, the opportunity to exert energy in tactile learning can be just as beneficial for non-ADHD students. Also, conceptual information can be built through the act of building, creating, designing, and problem-solving. Further, when there is a high interest in the learning concept, intrinsic motivation is increased which makes the learning activity a “good fit” for the learner to retain the concept and improve performance (Lasky et al., 2016).

**Peer tutor.** Peer tutor is an instructional strategy in which students are paired to work together on an assignment, where one student is the tutor that gives assistance, instruction, and feedback to the tutee (Armstrong, 1999; Daley & Birchwood, 2009; Dupaul et al., 2011; Raggi & Chronis, 2006). Several studies have been conducted to examine the impact of peer tutoring in a classroom setting with students who have a learning disability or behavioral challenges that impede on their academic performance (DuPaul & Henningson, 1993; DuPaul, Ervin, Hook, & McGoey, 1998; Franca, Kerr, Reitz & Lambert, 1990; Greenwood, Delquadri, & Carta 1997; Locke & Fuchs, 1995; Robinson, Newby, & Ganzell, 1981). Using student peer-tutors is a readily accessible resource that can increase motivation and participation for ADHD students. General education classes may have a small amount of one-on-one instruction or academic

support needed from their teacher, which leads to a heightened frustration level in academic and negative behavior of students with ADHD (Dupaul et al., 2011).

Moreover, using peer tutoring as an instructional accommodation for students with learning disabilities or behavior disorders enhanced on-task behavior, social interactions, and decreased disruptive behavior (DuPaul & Henningson, 1993; DuPaul et al., 1998; DuPaul, Ervin, Hook, & McGoe, 1998; Franca, Kerr, Reitz & Lambert, 1990; Greenwood, Delquadri, & Carta 1997; Locke & Fuchs, 1995; Robinson, Newby, & Ganzell, 1981). The interaction students with ADHD encounter with a peer-tutor in a smaller setting can also bridge over into having a positive student role model to learn acceptable behavior and curb negative behavior (Armstrong, 1999; Daley & Birchwood, 2009; Dupaul et al., 2011; Raggi & Chronis 2006). Not only will the use of long-term peer tutoring improve academic skills, but it can also have an impact on the development of social skills for students with ADHD. Additionally, classwide peer tutoring (CWPT) also has been researched to examine the effects on classroom behavior and academic performance of students with ADHD. Even with the most severe attention and behavior problems students with ADHD, implementing CWPT leads to significant increase in attentive behavior toward the learning task and improvement in academic performance (DuPaul et al., 1998). Overall, the instructional strategy of peer tutoring in the use of pairs or classwide has been proven effective in decreasing off-task behavior and sustained engagement in the learning task with students that have ADHD.

**Teacher think-aloud.** Teacher think-aloud is a widely used metacognitive strategy for instruction, in which the teacher models the thinking process by verbalizing their thoughts. How the instruction is taught plays a vital role in a student's comprehension of the concept and academic success. "The more students are cognizant of 'how' and 'what' to do while reading

and thinking, the more control and ownership they have over their learning” (Bernadowski, 2016, p. 4). The success of the think-aloud process is greatly dependent on the teacher’s ability to effectively model and facilitate the think-aloud process (Farr, 2004). When teachers model the thinking strategies they use, students can become more self-aware, which can improve their attention and engagement toward the learning task (Marzano et al., 1988).

Furthermore, implementing teacher think-aloud strategy can help students with ADHD process information and guide the student through an assignment task. Students with ADHD or exhibit ADHD symptoms are found to have challenges with writing skills such as, planning, organization, penmanship, sentence structure, and producing a completed writing task (Barkley, 1995; Cornoldi, Barbieri, Gaiani, & Zocchi, 1999; Seidman et al., 2001). Skilled writing, as in the ability to express thoughts through written language is comprised of all of the processes of EFs: organization of information, planning, working memory, attentiveness, and inhibition.

To express thoughts through written language, one must be able to apply writing strategies and shift through different components of the writing process to develop a clear and concise text. Moreover, a critical EF for producing writing expression with meaning is working memory. Working memory enables a student to transfer and concentrate attention between the writing task and schema to develop written text related to a particular topic. For example, a student with ADHD may be able to generate ideas for a writing topic, but the student struggles to develop and produce a written piece of work due to EFs deficits in working memory, organization, or planning (Re, Pedron, & Cornoldi, 2007). A strategy that helps students with EF deficits is modeling a think-aloud. This strategy aids students when tasked with expressive writing.

Additionally, students with ADHD that have a specific language impairment have been found to improve their writing with the use of the teacher think-aloud strategy when the teacher think-aloud strategy embeds modeling a specific writing strategy (Paz, 2001). The teacher think-aloud strategy is also effective in the content of mathematics through the use of math journals (Bernadowski, 2016). For instance, math teachers who utilize the teacher think-aloud strategy to model how to think through and solve a word problem found that their at-risk students diagnosed with various disabilities and behavioral challenges, improved in their written responses, such as rereading for accuracy in math computation, accuracy in sentence structure, and explanation of solving math word problems (Bernadowski, 2016).

In reading instruction, the teacher model think-aloud strategy helps students to monitor their comprehension of the text while reading and thinking. Additionally, it prompts students to engage in better discussions and interest in the text (Oster, 2001). The teacher model think-aloud strategy can also be used as an informal assessment during reading instruction to identify a student's area of lack in knowledge, misconceptions of the literature, and difficulties interpreting text (Oster, 2001). This strategy also has been found to increase student participation and comprehension of the literature when it is the primary basis of instruction.

**Visualization.** The visualization strategy, or sometimes called, “visual-imagery” is the process of painting a picture or visualizing in the mind, events that are taking place within a text (Miller, 2004). Visualization has been widely used to help struggling readers engage in the text by creating pictures in their minds. Research has conveyed that when using visualization as a reading comprehension strategy, the imagination is stimulated, increased involvement with the text occurs, and mental imagery is improved (Chan, Cole, & Morris, 1990; Miller, 2004; Sadoske, 1988). Students with learning disabilities benefit from the use of visualization-imagery

strategy in instruction to improve comprehension of literature (Chan, Cole, & Morris, 1990; Miller, 2004). In addition, children with ADHD have a tendency to process information slower or have difficulty with auditory memory, auditory attention, and processing of auditory information (Barkley, 1990; Gascon, 1986; Riccio, Hynd, Cohen, Hall, & Molt, 1994). In an effort to intervene processing deficits of a student with ADHD, visualization is an effective strategy to help process and organize thinking.

### **Behavioral Interventions**

Students with ADHD encounter many struggles that hinder their academics, such as lack of organization, lack of social skills and making friends, and being reprimanded for their behavioral disorders (Daley & Birchwood, 2009; Dupaul et al., 2011; Ogg et al., 2013; Visser et al., 2015). The academic and behavioral struggles can have an adverse impact on how children with ADHD view themselves, which can cause lack of motivation and effort in academics. Before implementing interventions occur to meet the needs of students with ADHD, it is important to begin with *affective strategies* that allow teachers to have a sense of the student's inner emotions (Armstrong, 1999). Affective strategies are strategies learned to control positive and negative emotions and motivation (Oxford, 1990). To help any student, teachers must understand the child's emotional state and root of motivation or lack thereof. Teachers being more aware of affective strategies can positively enhance the learning environment and behavior of students with ADHD.

The act of encouragement, positive reinforcement, and highlighting a student's strength builds a child's inner-self to help them feel valued, which in return can promote positive behavior and academic improvement (Armstrong, 1999). For this research study, implementing a web-based PD for teachers of ADHD students will conveniently provide an opportunity for

teachers to not only enhance their knowledge and skills of ADHD, but provide a peer support atmosphere. Developing a collaborative support builds a learning community that embraces the unique learning needs of students. Utilizing the collaborative approach will also influence teachers to share background experiences and ideas that may be supportive of each other in increasing instruction and improving the academic and behavioral performance of students with ADHD.

**Self-monitoring.** Self-monitoring involves the student in setting goals for on-task behavior, completing a task and adhering to those goals to self-reward upon completion (Raggi and Chronis, 2006). Through self-monitoring, the students can learn self-independence, accountability, and responsibility for their actions. For this single case study, teachers are provided various classroom management techniques without a tangible reward to decrease and eliminate off-task behaviors for students with ADHD. On the contrary, teachers are more prone to use a reward point system with students that have ADHD for positive behavior along with consequences for negative behavior in a controlling manner (Armstrong, 1999). The negative side to a reward point system is that it can increase the negative behavior for students with ADHD because they can become upset and display negative behavior for loss of points (Armstrong, 1999; Daley & Birchwood, 2009; Dupaul, Weyandt, & Janusis, 2011). Additionally, students with ADHD may also see themselves as a failure, which can trigger a negative emotion (Armstrong, 1999; Daley & Birchwood, 2009; Dupaul, Weyandt, & Janusis, 2011). Essentially, using behavioral strategies such as self-monitor and collaborative discipline empowers the student internally (Armstrong, 1999; Daley & Birchwood, 2009; Dupaul et al., 2011; Raggi & Chronis 2006).

**Self-regulation.** Unlike self-monitoring, self-regulation allows the student to evaluate their behavior using a Likert-type scale ranging from poor to excellent (Dupaul et al., 2011). In monitoring self-regulation, teachers may use the same Likert scale to evaluate the student behavior; and then the student receives reinforcement from the teacher depending on the self-evaluation rating. As the student demonstrates a positive change in behavior, the frequency of using the Likert scale to evaluate behavior reduces, which leads to positive effects of on-task behavior and academic performance of students with ADHD (Dupaul et al., 2011; Reid, Trout, & Schartz, 2005). Habitual goal setting is also seen as an essential intervention for students with ADHD to bring cognizance of academic performance and persistence. Furthermore, there is an improvement in frequency of completed class assignments and performance on assignments is when goal setting and self-monitoring is implemented with students that have ADHD (Johnson & Reid, 2011).

**Daily Report Card (DRC).** A daily report card (DRC) is a frequently used behavior intervention tool that provides ongoing feedback to students and parents about in-class targeted behavior and daily academic performance (Dupaul, Weyandt, & Janusis, 2011). The student's behavior and academic performance is evaluated and recorded daily by the teacher and sent home with the student to be seen by the parent. This process encourages the parent to reinforce the goals and expectations set to help the student have an encouraging and successful learning environment. The classroom behavior and academic performance increases when a DRC is used as a behavioral intervention with students that have ADHD (Dupaul et al., 2011; Murray et al., 2008; Owens et al., 2012).

As this section conveys, academic and behavioral interventions are an integral part of students with ADHD being successful. Key factors that contribute to the internal negative



behavior of students with ADHD and poor academic performance is the lack of teacher competence and instructional techniques to support the learning and management of behavior for ADHD students (Daley & Birchwood, 2009). ADHD perceives to be a negative diagnosis, but educators must learn to tackle the behavioral and academic effects of ADHD with positive reinforcement, stimulating differentiated instruction, and with a sense of emotional concern for the student (Sutherland et al., 2005). When teachers are more knowledgeable of the clinical and learning ADHD disabilities, they can provide a more positive learning environment that promotes the differentiated learning needs for ADHD students to be successful (Daley & Birchwood, 2009; Sutherland et al., 2005).

### **Methodological Literature**

Literature suggests that no one single type of methodology approach is best for all situations. The research problem, personal experience, and the audience determine the research approach (Creswell, 2013). Factors such as values, the intent of the evaluation, the nature of stakeholders, and the available resources influence the choice of methods selected for the study (Lizalone & Schiuma, 2015). To intensively explore a program, an event, activity, a process, or one or more individuals, a single case study approach is used. Single case studies can be time consuming due to the responsibilities that consist of the researcher collecting in-depth information and using multiple data collection procedures to develop a detailed analysis of case studies results in an effort to improve the program or existing conditions (Stake, 1995 & Yin, 2009). A case study method allows the researcher to explore beyond quantitative statistical data and examine the behavioral conditions through the research participant's perspective (Zainal, 2007). Case studies that utilize quantitative and qualitative data convey the process and outcome of the phenomenon through observation and analysis of the cases (Tellis, 1997).

There are three case study categories: exploratory, descriptive, and explanatory (Yin, 1984). A common approach in education to evaluate the effectiveness of educational programs, PD, and teaching and learning initiatives is using a case study descriptive approach. A descriptive theory is presented to support the description of the phenomenon and support rigor in the case study. Case studies in education should not be limited to only using a qualitative method, but a combination of quantitative and qualitative data to excavate all important information that arises from the data (Zainal, 2007). A descriptive approach is used to describe the natural phenomena that occurs within the data in question for this single case study.

Researchers Dingle and colleagues (2011) conducted a qualitative case study approach that analyzed interview data, observation field notes, and surveys to gain an in-depth understanding of complex interactions that reveal how and why teachers varied in their implementations of instructional reading strategies taught in a literacy learning cohort. By utilizing a single case study approach, Dingle and colleagues (2011) uncovered the interaction of meaningful factors specific to the phenomenon with holistic descriptions and explanations. Zentall & Javorsky (2007) utilized a qualitative case study with varied survey types such as pre- and post-surveys, and observation documentation to better understand the case being observed. Findings of this study indicated and validated that in-service PD can improve teachers' attitude and increase knowledge of ADHD and effective strategies for teaching students with ADHD (Zentall & Javorsky, 2007). Considerable research often compares pre- and post-survey data to analyze relationships between characteristics of the units, identify patterns and themes relative to the phenomena (Fry & McKinney, 1997; Raggi & Chronis 2006; Wiggins & Follo, 1999; Wiggins et al., 2007; Zantall & Javorsky, 2007). For the purpose of this study, a single case study descriptive approach is used with triangulation of qualitative data from interviews,

documentation, the PD modules open-ended task questions, open-ended survey questions and data from survey questions to provide corroborative evidence and depth to the study.

### **Review of Methodological Issues**

Since research methods are based on the research problem, personal experiences and the audience, researcher bias can affect the validity of the data. Unbiased and valid research requires competent knowledge of the multiple methods used, thorough analysis of procedures, accurate measuring tools, and ability to comprehend and interpret data derived from the different methods. Essentially, if the researcher is not knowledgeable and skilled in the various methods of research, it can devalue the rigor and validity of the research study (Beazley, 2004). Thus, it is vital the researcher identifies the purpose of the study and utilize appropriate methods to discover and analyze findings from the data.

Literature reveals single case study analyses are criticized for subjectivity by the researcher and external validity, and rigor (Long & Hollin, 1995; Flyvbjerg, 2006). Case study methodology can result in challenging the researcher's "preconceived views, assumptions, concepts, and hypotheses" (Flyvbjerg, 2006, p. 235) because of the triangulation of rich data discovered in the case study. Researchers must ensure that biased views do not interfere or influence data findings and conclusions (Yin, 1984 as cited in Zainal, 2007). Another issue with case study methodology is the criticism for obtaining a generalization based on a single case exploration (Tellis, 1997). However, using various data sources and triangulation of data can confirm and validate the case study process. For this single case study, a descriptive approach is used to describe the natural phenomena to provide rigor in the case study and triangulation of data from qualitative and quantitative data sources to generalize data findings.

In addition, case studies often utilize grounded theory; however, research shows that some researchers are not purposeful or selective in sampling (Glaser, 1978; Morse, 1991). The grounded theory sampling is mostly through interviewing individuals that can significantly contribute in-depth knowledge and provide a primary source of data for the study (Baker, Wuest, & Stern, 1992; Glaser, 1978; Morse, 1991). In grounded theory, researchers have the option of a focused sample or more diverse sample. Researchers, Lincoln & Guba (1985) and Hutchinson (1993) suggest sampling in grounded theory be broad and diverse to guarantee a wide range coverage of data. However, Glaser & Strauss (1967) recommend the choice of sampling should be determined based on the researcher's proposed conceptual level of theory.

### **Synthesis of Research Findings**

A common factor found in various educational research is teachers lack knowledge about the neurodevelopmental disorder, ADHD, and competency of how to teach students that are diagnosed with ADHD (Hepperlen et al., 2002; Jones & Tuscano, 2008; Martinussen et al., 2011; Ohan et al., 2008; Sutherland et al., 2005; Youssef et al. 2015). Teachers face challenges when students with ADHD are placed in mainstream classes without the academic support of inclusion from the special education teacher (Florian & Linklater, 2010; Gehrke & Cocchiarella, 2013; Martinussen et al., 2011; Srivastava et al., 2015; Sutherland et al., 2005). PD targeted with research-based interventions have been successful in improving the instructional methods teachers use to accommodate students with learning disabilities and behavioral concerns such as ADHD (Clarfield & Stoner, 2005; Diamond & Lee, 2011; Dupaul et al., 2011; Mautone et al., 2005; Raggi & Chronis 2006; Waheed et al., 2011).

Additionally, ODD is a common disorder that co-occurs with ADHD which causes negative interactions at home, school, and with peers. ADHD increases the chance of being

diagnosed with a conduct disorder (CD), which also negatively impacts social interaction (Larson et al., 2011; Strine et al., 2006). Furthermore, statistics indicate one in five students with ADHD are also diagnosed with anxiety, and one in seven students with ADHD are also diagnosed with depression (Larson et al., 2011). Consequently, adolescents diagnosed with ADHD who exhibit symptoms of impulsivity or hyperactivity or rejected by peers due to their intrusive and aggressive nature (Strine et al., 2006). The rejection by peers of adolescents with ADHD negatively triggers anxiety, mood disorder, and can lead to substance abuse in teenagers diagnosed ADHD (Strine et al., 2006).

Children with ADHD also experience problems that co-occur with conduct and/or psychiatric disorders. Some of these issues are described as oppositional defiant disorder(ODD), conduct disorder (CD), learning disorders (LD), peer relationships, and EF deficits affecting collaborative learning in the classroom setting (Larson, Russ, Kahn, & Halfon, 2011; Saunders & Chambers, 1996). Fifty percent of children ages 6-17 diagnosed with ADHD may also have a LD, which causes significant challenges for academic success in a classroom setting (Pastor & Reuben, 2008). For that reason, it is critical for teachers to acquire specific training in teaching students with ADHD who may experience learning difficulties in more than one area in addition to battling the symptoms of ADHD.

Furthermore, benefits of web-based PD have allowed teachers to efficiently attain the essential pedagogy to provide instruction on a level that will sustain the focus needed and improve the working memory of students with ADHD (Barnett et al., 2012; Bos et al., 1997; Cakir & Horzum, 2013; Kao & Tsai, 2009; Kinzie et al., 2006; Whitaker et al., 2007). An increasing body of research reveals that direct cognitive intervention with opportunities of structured activities for students with ADHD can help improve attentional abilities and social

behavior (Armstrong, 1999; Daley & Birchwood, 2009; Dupaul et al., 2011; Raggi & Chronis 2006). Research-based instructional and behavioral practices that focus on EFs aimed to enhance attention skills or working memory reveals encouraging effects for behavioral and academic outcomes for students with ADHD (Armstrong, 1999; Barnett et al., 2012; Bos et al., 1997; Cakir & Horzum, 2013; Daley & Birchwood, 2009; Dupaul et al., 2011; Kao & Tsai, 2009; Reid et al., 2005). It is essential that educators be cognizant of behavioral indicators of inattention in the classroom and provide targeted academic and behavioral strategies that maximize student engagement to promote academic and behavioral success (Daley & Birchwood, 2009; Dupaul et al., 2011; Harrison, 2013; Raggi & Chronis 2006).

### **Critique of Previous Research**

ADHD is a common childhood disorder that has brought much dialogue and examination from education and social science researchers. Research has been studied on the teacher knowledge capacity of ADHD and impact of teacher-efficacy when teaching students with ADHD. A substantial amount of literature exists supporting the idea that teachers are more prepared and knowledgeable to teach students with ADHD after receiving in-service training on ADHD (Atkins et al., 2003; Barnett et al., 2012; Bryk & Schneider, 2002; Florian & Linklater, 2010; Froelich et al., 2012; Gehrke & Cocchiarella, 2013; Rogers, 1995; Srivastava et al., 2015). Further, research indicates a positive impact on teacher practices when provided PD over an extended amount of time with a follow-up that embeds, active learning, collaboration, self-reflection, and purposeful PD content for teaching students with ADHD (Diamond & Lee, 2011; Dupaul et al., 2011; Johnson & Reid, 2011; Lasky et al., 2016; Mautone et al., 2005; Owens et al., 2012; Raggi & Chronis 2006).

On the other hand, a weaknesses in various research on PD for teachers of students with ADHD is failing to provide frequency of interventions implemented to students with ADHD (Barkley & Knouse, 2010; Clarfield & Stoner, 2005; Diamond & Lee, 2011; Dupaul et al., 2011; Mautone et al., 2005; Martinussen et al., 2011; Raggi & Chronis 2006; Sutherland et al., 2005). Secondly, there is a lack of participant description with ADHD as to their academic levels and behavioral characteristics that warranted a need for instructional or behavior intervention. Moreover, examination and discussion of adolescents with ADHD behavior in a structured learning environment is limited (DiCroce et al., 2016; DuPaul & White, 2006; Visser et al., 2015).

Some research studies provided descriptions of misbehavior perceived by teachers of students with ADHD but failed to provide any discussion or analysis of behavioral interventions implemented to reduce disruptive behavior outside of psycho-stimulate medication (Cullinan, 2004; DiCroce et al. 2016; Junod et al., 2006; Steiner et al., 2014). Although previous research examined the effectiveness of teacher in-service training on teaching students with ADHD, the focus was more on growth in teacher efficacy and teacher knowledge of ADHD. In addition, few studies examined in-service training for teachers on ADHD influenced academic performance or behavioral performance of ADHD students (Hepperlen et al., 2002; Hoy, 2000; Jones, & Chronis-Tuscano, 2008; Kao et al., 2011; Tschannen-Moran, & Hoy, 2001).

As teachers implement new learned skills and practices in teaching students with ADHD, there is a lack of examining the improvement of EFs deficits once instructional and behavioral accommodations are applied (Barkley, 2012, 2013; Diamond, & Lee, 2011; Johnson & Reid, 2011). Teachers should be cognizant of students with ADHD EFs deficits and implement specific academic and organizational strategies that would benefit their working memory. There

are many studies indicating the relationship between inattentive symptoms and academic performance, which is being strengthened by EF deficits. Research conveys mixed views as to if EFs deficits, co-morbid conduct problems, or hyperactive-impulsive symptoms have an influence on the academic performance of students with ADHD (Bierdman et al., 2004; Daley & Birchwood, 2009; Johnson & Reid, 2011).

However, there is still little research that examines if certain behavioral interventions or instructional accommodations improve EFs deficits to the point where they are no longer needed for adolescents with ADHD as they grow into adulthood. It is important for districts, schools, and teachers to research and implement best practices that lend to the cognitive processes essential to learning and externalizing EFs deficits in children with ADHD (Armstrong, 1999; Barkley, 2012; Diamon & Lee, 2011; DuPaul, 2004). The limited PD for teachers of students with ADHD marks a relevant and central concern in how students with unique needs are educated (Hepperlen et al., 2002; Jones & Tuscano, 2008; Ohan et al., 2008; Prothero, 2008; Youssef et al., 2015). Based on prior research, literature exemplifies the need for more opportunities for PD that provides equitable approaches to accommodate the academic and behavior deficits of students with ADHD in the classroom (Florian & Linklater, 2010; Gehrke & Cocchiarella, 2013; Martinussen et al., 2011; Srivastava et al., 2015; Sutherland et al., 2005).

## **Chapter 2: Summary**

The literature review presented studies that indicate teachers are in need of research-based interventions to help students diagnosed with ADHD be as academically successful as non-ADHD students in mainstream classrooms. As teachers become receptive to new learning methods for teaching students with ADHD, leads to an increase in teacher self-efficacy, knowledge, and empowerment to ensure instructional methods implemented meet the needs of



all learners (Florian & Linklater, 2010; Gehrke & Cocchiarella, 2013; Srivastava et al., 2015). Various instructional and behavioral interventions have also been examined by researchers that accommodate EF deficits in students with ADHD, improve cognitive thinking, sustain focus, and channel presumed “negative” behavior with high stimulating lessons (Bos et al., 1997; Diamond & Lee, 2011; Dupaul et al., 2011; Johnson & Reid, 2011; Lasky et al., 2016; Mautone et al., 2005; Owens et al., 2012; Raggi & Chronis 2006; Waheed et al., 2011). Additionally, researchers have argued that in-service PD on ADHD has a positive effect on pedagogy and competencies of ADHD, ensuring targeted learning needs are met for students with ADHD (Dupaul et al., 2011; Johnson & Reid, 2011; Lasky et al., 2016; Raggi & Chronis 2006; Waheed et al., 2011). As noted above, research findings indicate implementing a strategic PD framework that encompasses research-based strategies and collaboration of practice experiences can promote buy-in from teachers to be receptive to new instructional methods (Birman et al., 2000; Shahi & Azhar, 2014; Virtue et al., 2015).

In addition, the literature review presents limited research on studies relative to teacher knowledge of ADHD. Further research is needed that addresses the correlation of long-term academic achievement of students with ADHD and use of research-based instructional and behavioral interventions used to accommodate students with ADHD EFs deficits (Sutherland et al., 2005; Waheed et al., 2011; Zentall & Javorsky, 2007). Moreover, research is needed in frequency of research-based interventions implemented with students that have ADHD in order to obtain improvement in academic and behavioural performance (Barkley & Knouse, 2010; Clarfield & Stoner, 2005; Diamond & Lee, 2011; Dupaul et al., 2011; Mautone et al., 2005; Martinussen et al., 2011; Raggi & Chronis 2006; Sutherland et al., 2005).

The next chapter includes a methodology overview for the single case study of web-based PD for teachers of ADHD students. Reviewed in the chapter are the methodology research design and the participants, sites of study, instrumentation, data collection and data analysis. Included is an explanation of the single case study approach and criteria for the population, sample, and implementation of the web-based PD. Also discussed are the methods used to address reliability and validity, triangulation, confidentiality, trustworthiness, credibility, transferability and ethical issues.

### **Chapter 3: Methodology**

Some students with ADHD display a variety of behaviors in the classroom that disturb the learning environment. The behaviors exhibited by students with ADHD affect their learning, and also the learning of their peers, and the instruction in the classroom. Without proper interventions, this recurrent action by students with attention-deficit hyperactivity disorder (ADHD) results in a hindrance to the teaching and retention of learning for all students in the classroom. Thus, it is critical for teachers to provide adequate interventions to accommodate and improve the cognitive deficits and executive functions (EF) needed for students with ADHD to achieve academic success (Tannok, 2007). The purpose of this single case study was: (a) to examine teacher perception of the learning from the professional development training on ADHD, (b) identify how teachers used the research-based strategies learned in instruction, and (c) identify trends in teacher knowledge of ADHD after the professional development.

Opportunities for general education teachers to gain knowledge of instructional skills and interventions for teaching students with ADHD continue to be limited (Barkley, 2016; DuPaul & White, 2006). The academic gap amongst students with ADHD compared to students without ADHD will continue to increase if instructional and behavioral interventions are not implemented in the classroom to support the cognitive deficits of students with ADHD (Barkley, 2016; DuPaul & White, 2006; Visser, Holbrook, Danielson, & Bitsko, 2015). As a result of the literature reviewed, and the concerns of teachers in the researcher's educational setting, a web-based professional development (PD) training initiative was developed to provide teachers with strategies for working with students diagnosed with ADHD.

Data were collected for this single case study through intensive in-depth interviews, the PD modules open-ended task questions, documentation, and surveys. Purposive sampling was

used to select participants for the study. Criteria for the sample selection included: (a) teaches students in second, third, fourth, or fifth grade in one of the two school sites for the study; (b) currently has one or more years of teaching experience; (c) instructs students in their classroom diagnosed with ADHD in the fall semester of September 2017; and (4) did not have any PD training on ADHD prior to the start of the current school year. Teachers recruited for the study participated in a web-based PD on research-based instructional and behavioral strategies for teaching students with ADHD. The teachers completed surveys, open-ended task questions in the PD modules, and semi-structured interviews. Interviews were transcribed, and data sources were triangulated for a deeper understanding of the phenomena. Chapter 3 contains information on the research method and data collection used for this study. This chapter also includes a description of the research design, population and sampling method, data analysis, reliability and validity, ethical issues, limitations, delimitations, and assumptions of the study.

### **Statement of the Problem**

ADHD is a behavioral condition that affects 11% of adolescents' learning and behavior (APA, 2013; CHADD, n. d.). The percentage of school-aged children and teens diagnosed with ADHD has also increased 43% from 2003 to 2011 (Clearly, 2015). The increase in the number of school-aged students with ADHD makes it critically essential for teachers to be well informed on how to teach students with unique learning and behavioral challenges associated with ADHD. ADHD behaviors such as inattention and hyperactivity cause learning challenges for students with ADHD, disruptions to the learning environment, and can hinder the learning process for their peers in the classroom (Siqueira & Gurge-Giannetti, 2011; Thompson, 2014). Additionally, symptoms of ADHD can contribute to chronic difficulties in academics, behavioral performance, and social skills (Daley & Birchwood, 2009; Dupaul et al., 2011; Thompson, 2014).

The problem on which this study focuses is that teachers lack the knowledge of research-based instructional and behavioral strategies for teaching students with ADHD. Targeted academic and behavioral needs must be identified and addressed with research-based interventions to meet the needs of students with ADHD while building teacher competency in ADHD (Daley & Birchwood, 2009; Ogg et al., 2013; Raggi & Chronis, 2006; Russell et al., 2014). However, research shows the lack of ADHD training for teachers has become a concern as the number of students with ADHD has increased over the last 10 years (Barkley, 2016; Barnett et al., 2012; Bos et al., 1997; Froelich et al., 2012; Visser et al., 2015; Zentall & Javorsky, 2007). Therefore, it is important that teachers equip themselves with the necessary instructional tools to engage students in learning and effectively handle challenging behaviors.

### **Purpose and Significance of the Study**

The purpose of this single case study was: (a) to examine teacher perception of the learning from the professional development training on ADHD, (b) identify how teachers used the research-based strategies learned in instruction, and (c) identify trends in teacher knowledge of ADHD after the professional development. General education teachers lack pre-service and in-service training to gain knowledge, instructional skills, interventions for working with students that are diagnosed with ADHD and meeting the learning needs of students with ADHD (Martinussen, Tannock, & Chaban, 2011; Sutherland, Denny, & Phillop, 2005). With nearly 3% of students in a classroom diagnosed with ADHD, the quality and frequency of training on ADHD for teachers has become a concern (Barkley, 2016; Barnett, Corkum, & Elik, 2012; Bos, Nahmias, & Urban, 1997; Froelich, Breuer, Doepfner, & Amonn, 2012; Visser et al., 2015; Zentall & Javorsky, 2007). By learning effective research-based instructional and behavioral

methods, teachers can become equipped with the necessary knowledge and skills to help improve the academic and behavioral performance of students who are diagnosed with ADHD.

Furthermore, research indicates by second grade it is more prevalent for students with ADHD to begin experiencing academic challenges in reading and math (Siqueira & Gurge-Giannetti, 2011; Thompson, 2014). The academic problems in reading and math are found to be associated with symptoms of ADHD such as inattentiveness, working memory, and executive function (EF) deficiencies (Siqueira & Gurge-Giannetti, 2011; Thompson, 2014). The Children's Attention Project conducted a long-term examination of ADHD and found that the percentage of second-grade students with ADHD who are below average in math and reading, is more than twice as high as the percentage of non-ADHD students who are below average in reading and math. Specifically, 33% of second-grade students with ADHD were reading below average, as compared to 6% of non-ADHD students reading below average (Thompson, 2014). Additionally, 44% of second-grade students with ADHD were below average in math skills when compared to 15% of non-ADHD students below average in math skills (Thompson, 2014).

Given the data findings presented, it is critical to provide teachers of students with ADHD as early as second grade, pedagogy on ADHD interventions to accommodate the cognitive challenges and behavioral disorders associated with ADHD. Therefore, a web-based PD training initiative was developed to provide teachers with strategies for working with students diagnosed with ADHD. The participants for this single case study consisted of second through fifth-grade teachers that attended two elementary campus sites. A web-based format was used for the teacher training initiative on learning about ADHD and clearing misconceptions teachers may have about ADHD.

## **Research Questions**

The research questions for the study are as follows:

1. What is the perception of teachers concerning the learning from the professional development training on ADHD?
2. How did teachers use the research-based strategies learned in the professional development?
3. What were the trends noticed in teacher level of knowledge as indicated in the KADDS survey before and after the professional development training?

## **Research Design**

This single case study was designed to examine a web-based PD initiative for teaching students with ADHD. A case study methodology was used to explore an issue or problem where the case is described in detail, and an in-depth understanding emerged from examining the case (Stake, 1995). The phenomenon investigated in this study was the teacher's perception of the web-based PD training and the strategies presented for teaching students with ADHD. The case for this single case study was second through fifth-grade teachers from two elementary public schools in the southwest area or region of the United States and did not have any PD training on ADHD prior to the current school year. Evaluative surveys and teacher interviews were conducted in this single case study to gain teacher participants' perspective of the web-based PD training for teachers of students with ADHD. Descriptive statistics were used to describe the individual teacher perceptions and knowledge of ADHD before and after the PD training. Additionally, the constant comparison method was used to analyze the data and identify thematic patterns.

For this study, purposive sampling was used to select participants who have experience with teaching students that are diagnosed with ADHD and capable of clearly reflecting their experiences. Purposive sampling is a method often used in case studies to study the causes of an action or issue. In purposive sampling, the researcher develops criteria to ensure that the participants selected in the sample are knowledgeable or have experience with the phenomenon of interest and can reflectively communicate their experiences and opinions. Creswell (2013) posits that purposive sampling is based on selected characteristics of the population and the context of the study. The population characteristics of this study were second through fifth-grade teachers of ADHD students who did not have any PD training on ADHD prior to the current school year.

For qualitative studies, it is much more important for the research to be intensive with in-depth interviews and multiple sources of data to build patterns, categories, and themes for a deeper understanding of the phenomena, than include large sample sizes (Crouch & McKenzie, 2006; Patton, 2002). Qualitative studies that have a small number of participants, less than 20, have been noted to establish a trusting relationship between the researcher and participants. Further, a small number of participants can enhance open and honest communication and reduce biases and threats to validity (Crouch & McKenzie, 2006). Qualitative studies having one case is sufficient to provide new ideas and understanding (Crouch & McKenzie, 2006; & Patton, 2002).

Additionally, interviews for this single case study were collected until saturation was reached. Saturation of data occurs when there are no longer new ideas or themes identified as data are collected and analyzed (Creswell, 2013; Crouch & McKenzie, 2006; Patton, 2002). Furthermore, the in-depth interviews aided in gaining a thorough understanding of the teacher participants' experiences implementing research-based strategies learned from the web-based



PD, which is significantly relevant to the study. Therefore, a large sample of participants was not needed.

### **Study Site**

The location for the study consisted of two elementary campuses within the same school district located in the United States. The average population of the elementary schools ranged between 680 and 750 students. Both schools' administrative teams consisted of one principal and two assistant principals. The instructional support staff for the two campuses is comprised of an academic specialist, instructional technologist specialist, reading and math interventionist, two counselors, and two special education teachers. The years of teaching experience from the two campus study sites ranged from novice to 25 years. The demographics of both campus populations indicated a diverse student population averaging 70.75% Hispanic, 11.95% African American, 10.65% White, 3.65% Asian, and 1.65% American Indian, and 1.3% other. The two elementary schools offered learning programs for students that consisted of the following: Gifted and Talented, Bilingual Program, Dual Language Program, Life Skills Program, Dyslexia Program, and Special Education.

### **Population and Sampling Method**

Purposive sampling was used for selecting teacher participants for this single case study. The population for the study consisted of 48 teachers of second through fifth-grade students who teach at the two elementary campus sites of study. An email invitation was sent to second through fifth-grade teachers that explained the study and asked for volunteers to participate in the study. The invited teachers were informed of their right to not participate in the study and how to withdraw from the study at any time without any ramifications or negative consequences.

Information was provided on how to discontinue participation in the study as well as contact information.

It was anticipated to have at least 10 teachers who meet the inclusion criteria to participate in the web-based PD and volunteer to be part of the single case study. The qualifying criteria used in the single case study included: (a) teaches second, third, fourth, or fifth grade in one of the two school sites for the study; (b) currently has one or more years of teaching experience; (c) instructs students in their classroom diagnosed with ADHD in the fall semester of September 2017; and (4) did not have any PD training on ADHD prior to the start of the current school year. Teachers also needed to be willing to participate in the training and use the research-based strategies from the training in their instruction. These criteria bound the case. There was a total of 10 teachers from the two elementary study sites who met the inclusion criteria and qualified for the study. Only 6 of the 10 teachers who met the criteria for the study volunteered to be part of the study and signed consent.

### **Study Procedures**

After the invited teacher participants signed a consent form to be part of the study, the participants were able to access to the web-based PD and given 10 school calendar days to complete PD. The teacher participants were offered the option to participate in the web-based PD on their campus after the instructional day or at home. Once teacher participants completed the web-based PD, they selected one to three students diagnosed with ADHD whom they felt would benefit from the research-based instructional and behavioral interventions learned in the web-based PD being used in their instruction. Teacher participants used criteria for selecting students with ADHD to implement the various research-based strategies presented in the web-based PD. The criteria for student selection included: (a) documentation or record of medical

diagnosis of ADHD; (b) a current student of the teacher participant's class; and (c) exhibits one or more of the characteristics of predominately inattentive and hyperactive-impulsive symptoms of ADHD as shown in Table 1. Teacher participants also utilized a checklist-monitoring tool as a note-taking system to record how the selected students diagnosed with ADHD responded to the research-based strategies and interventions.

Next, within seven days after completing the web-based PD, teacher participants implemented the various research-based strategies presented in the web-based PD for two weeks. During this two-week period, teacher participants also utilized a checklist-monitoring tool as a note-taking system to note-take how the selected students responded to the research-based instructional and behavioral interventions and the effectiveness of the interventions. Instead of using the student's names to record the daily interventions and responsive actions of the teacher and student, the student's identity was protected in teacher notes by using codes. The codes consisted of an alphabet system that did not correlate with the student's initials. For example, "Student Z" or a number system "Student #1" to ensure confidentiality of the student.

Lastly, teacher participant interviews were conducted within seven days of completing two weeks of implementation of the various research-based instructional and behavioral strategies presented in the web-based PD. Teacher participant interviews were conducted beginning in October 2017 and were completed by December 2017. Then data was collected to be described by using descriptive statistics and analyzed using the constant comparison method for coding the responses.

### **Web-Based Professional Development Implementation**

The web-based PD, *Teaching Students with ADHD: Research-based Instructional and Behavioral Strategies* was developed by the researcher, a former instructional specialist. The

web-based training was developed to address the needs of the schools due to limited PD on ADHD for teachers of students with ADHD. Teachers at the campus sites of study voiced a concern of commonalities seen in students with ADHD, such as academic challenges and inappropriate conduct that heightened during the structured instructional block. The practices of the school for teaching students with ADHD ranged from no altered instructional techniques to shortened tasks, small group instruction, peer/group assignments, isolation, or removal from the learning environment.

The web-based PD modules for the training were based on findings in literature on research-based and evidence-based strategies for working with students diagnosed with ADHD (Armstrong, 1999; Atkins, Graczyk, Frazier, & Abdul-Adil, 2003; Bryk & Schneider, 2002; Daley & Birchwood, 2009; Dupaul et al., 2011; Lasky et al., 2016; Murray, Rabinar, Schulte, & Newitt, 2008; Owens, Holdaway, Zoromski, Evans, & Himawan, 2012; Raggi & Chronis 2006; Rogers, 1995). To identify the teacher participant overall knowledge of ADHD prior to beginning the content modules on ADHD a pre-KADDS survey was embedded in the web-based PD training. Following the content modules presented in the web-based PD, a post-KADDS survey was conducted to identify shifts or trends in teacher participant's overall knowledge of ADHD prior to beginning the content modules on ADHD. After completion of the web-based PD modules on ADHD, a survey was given to teacher participants to collect information on the teacher participants' perception of the web-based PD training. The outline of the web-based PD is presented in Appendix A.

### **Web-Based Professional Development Modules**

The content of the web-based PD was developed as a response to intervention for instructional needs and effective classroom behavior strategies for teaching students diagnosed

with ADHD based on the teachers' common concerns about ADHD at the both study sites.

Various literature on cognitive practices for students with ADHD was reviewed and checked for alignment with the instructional methods of the campus sites of study, district curriculum, and state learning standards. Following, the frequency and effectiveness of implementation of the research-based strategies for teaching students with ADHD were researched. Instructional and behavioral resources for the PD was based on the research of: Armstrong, 1999; Atkins et al., 2003; Barkley & Knouse, 2010; Barkley, 2012; Barley, n.d.; Barry & Messer, 2003; Bryk & Schneider, 2002; Clarfield & Stoner, 2005; Daley & Birchwood, 2009; Diamond & Lee, 2011; DuPaul, Weyandt & Janusis, 2011; Dupaul et al., 2011; Harrison et al., 2013; Lasky et al., 2016; Mautone et al., 2005; Murray et al., 2008; Owens et al., 2012; Raggi & Chronis 2006; Rogers, 1995; and Trout, Lienemann, Reid, & Epstein, 2007.

The research-based instructional interventions and behavioral strategies presented in the web-based PD have been implemented across the world in various learning institutions with a diverse demographics of students and found to be effective in most cases (Barley, n.d.; Barkley & Knouse, 2010; Barkley, 2012; Barry & Messe, 2003; Clarfield & Stoner, 2005; Diamond & Lee, 2011; Weyandt & Janusis, 2011; Harrison et al., 2013; Mautone et al., 2005; Trout et al., 2007). Four content modules were presented in the web-based PD: background research on ADHD; the science of ADHD and the brain; research-based instructional interventions for students with ADHD; and research-based behavioral interventions for students with ADHD. In each module, teachers participated in various tasks that allowed them to share knowledge, experiences, ask and respond to questions while being a supportive teacher, and learner to other participants. Descriptions of the four content modules are presented in Table 2.

Table 2

*Web-Based Professional Development Content Modules*

| Modules  | Description   | References  |
|----------|---|---|
| Module 1 | Provides research on ADHD, the influence it has on student learning and behavior and expounds on the impact of how lack of teacher training on ADHD can be a pivotal affect to student success in school. | APA: DSM-5, 2013; Barkley, n.d.; CHADD, n.d.; Ogg et al., 2013; Raggi & Chronis, 2006; Strine et al., 2006  |
| Module 2 | Provides research on the scientific study of the brain of children with ADHD, cause-effects of ADHD, and the difference in cognition of adolescents with ADHD versus non-ADHD adolescents.                | ADHD Voices, 2012; TEDEd, 2010; TEDxCMU, 2013   |
| Module 3 | Provides various research-based instructional strategies that have been implemented with adolescents with ADHD and proven effective.  | Atkins et al., 2003; Armstrong, 1999; Barley, n.d., 2012; Barkley & Knouse, 2010; Barry & Messer, 2003; Bryk & Schneider, 2002; Daley & Birchwood, 2009; Clarfield & Stoner, 2005; Diamond & Lee, 2011; Dupaul et al., 2011 |
| Module 4 | Provides various research-based behavioral intervention strategies that have been implemented with adolescents with ADHD and proven effective.  | Dupaul et al., 2011; Harrison et al., 2013; Lasky et al., 2016; Murray et al., 2008; Mautone et al., 2005; Owens et al., 2012; Raggi & Chronis 2006;  |

**Data Instruments**

The data sources for this study were surveys, semi-structured interviews, documentation, and the PD module open-ended task questions. The following describes the purpose of these methods, the development of the instruments, and data collection.

## **KADDS**

The Knowledge of Attention Deficit Disorders Scale (KADDS) created by researchers, Sciutto, Terjesen, and Binder (2000) is widely known as the first instrument with reliability and validity published in the field of teacher preparation in regards to ADHD. Permission was requested and granted from Mark Sciutto to use KADDS in this research study with understanding that the scale not be reproduced in its entirety in any published document. As an extension to the web-based PD, the KADDS survey was embedded as a pre- and post-survey for teacher participants of this single case study. The KADDS survey was administered to participants to seek trends among teacher participants' scores and misconceptions of ADHD. In addition, the pre- and post-KADDS surveys were given to seek trends among what teacher participants know about ADHD before participating in the web-based PD and what they have learned about ADHD after participating in the web-based PD. The pre- and post-KADDS surveys collected data for research Question 3, which asks what trends were noticed in teacher level of knowledge as indicated in KADDS survey before and after the PD training.

KADDS measures three subscale areas of knowledge related to ADHD: general knowledge, symptoms/diagnosis, and treatment. The KADDS survey utilizes a 36 items questionnaire consisting of: 18 positive and 18 negative signs of ADHD using a true (T), false (F), or don't know (DK) format. Researchers Sciutto and Feldhamer have measured the reliability and validity of KADDS in five separate studies from 1996-2004 by using knowledge and exposure to children with ADHD, ADHD training, and ADHD knowledge and educational interventions (Herbert, Krittenden, & Dalrymple, 2004; Sciutto et al., 2000; Sciutto & Terjesen, 2004; Sciutto et al., 2004; Sciutto & Feldhamer, 2005). Data from these five studies suggested KADDS 36-item scale had a high internal consistency of .80 to .90 (Sciutto et al., 2000). The

results of KADDS within these five separate studies were directly comparable with other studies measuring the knowledge and conceptions of ADHD using KADDS without a need for any modifications to the questionnaire design. In addition, prior studies that utilized U.S. samples, KADDS internal consistency ranged from .82 to .89 and a sensitive assessment to educational learning in regards to teacher knowledge of ADHD (Herbert et al., 2004; Sciutto et al., 2004; Sciutto et al., 2016).

Comparable KADDS data has also been found in studies with teachers outside of the U.S. For instance, KADDS was administered to examine primary school teachers' knowledge of symptoms and management of students with ADHD in South African schools and the study was compared to previous research (Topkin, Roman, & Mwaba, 2015). The KADDS results indicated teacher participants in South African schools responding correctly to less than 50% of the KADDS items were almost parallel to previous research utilizing KADDS, with slightly higher responses in knowledge, a lower percentage of responses for misconceptions, but exact in percentage for lack of knowledge (Topkin et al., 2015). KADDS high internal consistency data from current studies and previous studies in the U.S. and in other countries supports the validity of the survey instrument (Sciutto et al., 2016).

### **Professional Development Open-ended Task Modules**

The open-ended task questions embedded in each module of the web-based PD provided teacher participants' perception of ADHD and interactions in an educational setting with students diagnosed with ADHD. In Module 1, teacher participants were to explain their perception of ADHD, what they already know about ADHD, and want to know about ADHD. Module 2, consisted of a self-reflection of the learning from video snippets about ADHD and the brain, in addition to explaining their interactions with students diagnosed with ADHD. In Module 3,



instructional strategies currently used in the classroom when teaching students with ADHD before participating in the PD was shared by teacher participants. Module 3 also extended teacher participants to reflect on the research-based instructional strategies presented in the PD that would be beneficial to students they currently teach that are diagnosed with ADHD.

Module 4, presented the opportunity for teacher participants to share behavioral strategies currently used in the classroom with their students who are diagnosed with ADHD. In addition, they were asked to reflect and share behavioral strategies presented in the PD that would be beneficial to students they currently teach that are diagnosed with ADHD. The last tasks in module 4 allowed reflection and sharing of their overall learning of ADHD and any shifts in thinking pertaining to instruction and behavior of students diagnosed with ADHD. Responses from the PD modules open-ended tasks provided data for research Question 1, which is to determine the perception of teachers concerning the learning from the PD training on ADHD. Teacher participant responses to Modules 1-4 open-ended task questions are presented in Table 11 (see Appendix I).

### **Professional Development Survey**

A Likert scale survey instrument administered online was used to collect data for research Question 1, which is to determine the perception of teachers concerning the learning from the PD training on ADHD (see Appendix B). The Likert scale PD survey was given to teacher participants after fully completing all four modules within the provided time period. The survey consisted of a 10-question 5-point Likert-type scale ranging from: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. The survey included six open-ended responses which is also presented in Appendix B. Two additional sections included demographic information, classroom management, and training received on the topic of ADHD.

These two sections of the PD survey supported in understanding the teacher participants' knowledge of ADHD and level of support relating to the effectiveness of the classroom interventions for students with ADHD. Items in the demographic section included age, gender, ethnicity, the number of years teaching, and the grade level currently teaching.

### **Documentation**

Documentation in case studies can be relevant to the study topic and can be of a variety in form. Case study documentation can consist of notes, written reports of events, progress reports, and physical artifacts (Yin, 2009). The primary use of documentation is to validate and supplement evidence from other sources (Yin, 2009). Also, generalizations are made from documents that can transpire new questions, ideas, and connections.

For this single case study, documentation consisted of a checklist monitoring tool to monitor how the selected students responded to the research-based instructional and behavioral interventions for students with ADHD and the effectiveness of the interventions (see Appendix C). To protect the student's identity in teacher notes, teachers only used codes to note daily interventions and responsive actions of the teacher and student. The information provided in the checklist-monitoring tool provided data for research Question 2, which is how teachers used the research-based strategies learned in the web-based PD in instruction. Teacher participants also used the checklist-monitoring tool during the interview as a reference to their noted experiences in implementing the research-based strategies to the selected students with ADHD. This data corroborated and augmented other qualitative data collected such as interviews and the KADDS survey.

## **Teacher Interviews**

The foundation of case studies is built upon interviews and used to provide a deeper understanding of the events that occurred from the perspective of the participants and their reaction (Albright, Pitney, Roberts, & Zicarelli, 1998). For this single case study, a semi-structured interview was conducted with teacher participants and shown in Appendix E. The interview protocol specified the general topics of interest. Once the interview was scheduled, each participant was given a list of the semi-structured interview questions for review with the understanding that there may be times where the conversation may stray from the semi-structured interview questions, if appropriate, as an extension to the study and their experiences during the study. The interview process for each teacher participant ranged from 60-90 minutes. Teachers were also informed about their rights as a participant in the research and the ability to discontinue the interview or break from the interview at any time before the interview began.

The participants were asked primarily open-ended questions in the semi-structured interview. Through the use of semi-structured interviews, the interviewer had a greater chance of learning about the perceptions and experiences of the study participants (Albright et al., 1998). The use of semi-structured procedures produced comparable data from all of the participants and gave an opportunity for dialogues of things the participant perceived as unique. Based on the teacher participant's responses, some questions were developed to use as follow-up questions. The interviews were audio-recorded to gather full responses to the interview questions and to highlight important quotes stated during the interview dialogue. Afterward, responses from the interviews were transcribed verbatim to be quoted accurately in the final analysis. The semi-structured interview provided data for all three research questions.

## **Data Collection and Analysis**

Various methods for collecting data and analysis of data were required to determine the perception of teachers concerning the learning from the web-based PD training on ADHD. The process of triangulation between different data sources were used to confirm and validate findings. Data collection instruments included surveys, the PD modules open-ended task questions, documentation, and teacher participant interviews. For this study, the procedures used to describe and analyze the data gathered from this single case study were descriptive statistics and constant comparison method. For descriptive statistics, a tabulated description was also used to present and describe data findings.

The constant comparison method was founded on Glaser's (1967) *Grounded Theory*, and commonly used for analyzing research data and developing themes based on the developed coding of responses (Allan, 2003; Glaser & Strauss, 1967). Researchers, Glaser and Strauss, discovered *Grounded Theory* as a theory derived from systematic data of social research, which provides the researcher with relevant predictions, explanations, interpretations, and applications. In utilizing this method, it encourages "theoretical insight that leads to descriptive and explanatory categories" (Lincoln and Guba, 1985, pp 334-341). Further, the constant comparison method is beneficial to case studies because of the constant comparisons that bring about theory from raw data (Kolb, 2012).

The constant comparison approach incorporates four stages: comparing incidents, integrating categories, delimiting the theory, and writing the theory (Glaser & Straus, 1967 as cited in Kolb, 2012). In these four stages, data are sorted, analyzed, coded, and the theory is reinforced by theoretical sampling (Kolb, 2012). By utilizing the constant comparison approach, concepts were attained and discovered from the data by simultaneously coding and analyzing

(Corbin & Strauss, 2008). The analysis of the data collection instruments used for this study are described below.

### **KADDS**

The KADDS survey was embedded within the web-based PD as a pre- and post-survey for teacher participants of the study. Participants in this study were given a pre- and post-KADDS survey to seek trends among teacher participants' scores and misconceptions of ADHD. Additionally, the pre- and post-KADDS surveys were used to find trends in what the participants already knew about ADHD before the PD and what they have learned about ADHD after the PD. Descriptive statistics were used to describe and summarize the KADDS data in a meaningful way.

### **Professional Development Open-ended Task Modules**

The open-ended task questions in modules 1-4 of the web-based PD provided teacher participants' perception of ADHD and interactions in an educational setting with students diagnosed with ADHD. Descriptive details, activities and instructional practices were observed to identify indicators of the phenomenon and codes were applied accordingly. Qualitative data such as responses from the PD open-ended task questions of modules 1-4 were analyzed using the constant comparison analysis for coding and to identify general themes and categorical patterns. All teacher participants' responses for each task of the web-based PD open-ended task questions from modules 1- 4 are presented in Appendix I.

### **Professional Development Survey**

A Likert Scale survey instrument was administered online to collect data to determine the perception of teachers concerning the learning from the web-based PD training on ADHD (see Appendix B). The online PD survey was embedded and administered at the conclusion of the

web-based PD. The PD survey consisted of 10 questions on a 5-point Likert scale regarding the content and delivery of the web-based PD and contained six open-ended questions. The 10 Likert scale responses were described using descriptive statistics to summarize the data in a clear and comprehensive manner. The PD survey open-ended responses were analyzed using the constant comparison analysis for coding and to identify general themes and categorical patterns.

To create detailed organizational data the Maykut and Morehouse (1994) format for of constant comparison analysis was utilized. This format consisted of five steps. Step 1: Carefully read and code each data piece. Step 2: Organize each data source by categories. Step 3: Compare each data piece to existing categories to determine if the new data connects with the existing data. Step 4: Identify emerging themes in each category. Step 5: Repeat the initial process to find significant themes. Descriptive details, activities and instructional practices were observed to identify indicators of the phenomenon and codes were applied accordingly. Descriptive statistics were also used to summarize PD survey data in a meaningful way.

## **Documentation**

The documentation for this single case study consisted of a checklist monitoring tool to monitor how the selected students responded to the research-based instructional and behavioral interventions for ADHD students and the effectiveness of the interventions (see Appendix C). The information provided in the checklist-monitoring tool provided data for research Question 2, which is how teachers used the research-based strategies learned in the web-based PD. Teacher participants also used the checklist-monitoring tool during the interview as a reference to their noted experiences in implementing the research-based strategies to the students selected with ADHD. The documentation was analyzed to identify and describe the themes or issues

presented in each case. This data validated and enhanced other qualitative data collected, such as the interview responses and KADDS surveys.

### **Teacher Interviews**

A semi-structured interview was conducted with teacher participants in this single case study. Interviews are highly utilized as a tool for exploring topics in social science research because of the open-ended responses, flexibility, and in-depth information received from personal experiences (Fontana and Frey, 2000). Participants were asked primarily open-ended questions in the semi-structured interviews. The interviews were audio-recorded to gather full responses to the interview questions and to grasp important quotes stated during the interview dialogue. Interview responses were transcribed verbatim to be quoted accurately in the final analysis. Additionally, interview responses were analyzed using the constant comparison analysis for coding and to identify general themes and categorical patterns utilizing the Maykut and Morehouse (1994) format for creating comprehensive organizational data. Line-by-line coding approach was significant to take note of themes and phenomena that were present. Analysis of descriptive details, activities, instructional practices were used to code any indicators of the phenomenon, and codes were applied accordingly.

### **Validation**

Multiple methods and triangulation of data sources in this qualitative research were used to develop a comprehensive understanding of phenomena. Case studies that involve various methods such as, observation, interviews, and recordings lead to more valid and reliable understanding of phenomena (Lincoln & Guba, 1985). For this single case study, the triangulation of data from surveys and audio-recorded interviews helped to gain a more in-depth

understanding of the teacher participants' perspective of the web-based PD and effectiveness of the research-based strategies implemented.

### **Triangulation**

Qualitative research uses triangulation to test validity through the conjunction of information from a variety of data sources. Data source triangulation provides more confidence in results when the same conclusion is drawn from the mixed-method approach. Furthermore, with the use of data triangulation, inadequacies found in using individual methods are decreased. For this study, data triangulation was used consisting of qualitative data from documentation, interviews, open-ended responses, and surveys. By using data from surveys, interviews, the PD modules open-ended task questions, and documentation, data triangulation provided different perspectives that are complementary to each other (Denzin 1978; Patton, 1999).

### **Trustworthiness**

Lincoln and Guba (1985) have identified trustworthiness as criteria that provides rigor in research. The trustworthiness of research data relates to credibility, dependability, transferability, and confirmability (Graff, 2014). Ensuring the five steps to conducting a case study approach were implemented, aided in the quality of trustworthiness and biases for this single case study. The five steps are as follows: the case study research question is clearly written; case study design is appropriate for the research question; purposive sampling strategies are applied; data are collected and managed systematically; and analyzed correctly (Creswell, 2013; Yin, 2009; & Stake, 1995). Trustworthiness was also established through the researcher's control for bias by use of semi-structured interviews, member checking, data collection, and comparison of this data. Furthermore, the triangulation of data sources also augmented the data quality and the confirmation of findings (Knafl & Breitmayer, 1989). Thus, utilizing a single



case study approach with triangulation of qualitative data sources increased the internal validity of the study and trustworthiness.

### **Confirmability**

Confirmability ensures findings of a study are the outcomes of participants' experiences and not the opinions of the researcher (Patton, 2002). In this single case study, the process taken to achieve confirmability consisted of recording teacher participants' interviews, transcribing of notes, and member checking of interview responses. Interviews with teacher participants were recorded to ensure the researcher's notes attained what the participant stated versus assumption of the participant's perception. Once the interviews were transcribed, teacher participants were given an opportunity to check their statements for truthfulness. To confirm findings, the process of member checking and rechecking the data enhanced confirmability (Trochim & Donnelly, 2006).

To demonstrate the findings emerged from the data and not the researcher's predispositions, steps were taken to achieve confirmability (Shenton, 2004). Audio-recording interviews provided opportunities to reflect what the participants stated in regards to their perceptions. Once the interviews were transcribed from the audio recordings, the participants crosschecked their responses for accuracy. Member checking ensured there are not any important details omitted or misquoted during the transcription. Confirmability assured the conclusions of the study are the opinions of the participants and not the researcher's beliefs (Shenton, 2004; Patton, 2002). The results were confirmed by using strategies for enhancing confirmability such as the procedures for checking and rechecking the data throughout the study (Trochim & Donnelly, 2006).

## **Credibility**

Member checking and triangulation are two components that authors Guba and Lincoln suggested as an effective approach to internal validity in qualitative research (Shenton, 2004). The credibility or confidence in the truth of the findings of this study was established in two methods: triangulation and member checking. Teacher participants' responses to interviews were repeated to ensure what was verbalized was intended to be spoken. For this single case study, member checking occurred at the end of this study after the teacher participant interview responses were transcribed.

Teacher participants individually reviewed their transcribed interview responses to check for an accurate representation of what the participant conveyed during the interview. Member checking also provided an opportunity for teacher participants to provide any additional comments or thoughts on the topic of study after the semi-structured interview. Dependability was derived from the evaluation of integrating data collection, data analysis, and conclusions (Graff, 2014). In addition, dependability was enhanced by modifying the research design or data collection as new findings developed.

## **Transferability**

As data findings are applied or transferred to real-world situations apart from the study enacts transferability (Graff, 2014). In this study, findings are presented with in-depth descriptions of the phenomena to ensure transferability and confirmability. Providing detailed descriptions of study results helped convey the experiences that took part in the study. Also, confirmability is exhibited by ensuring the qualitative findings are the result of the teacher participants' experiences and ideas and not preferences of the researcher.

### **Expected Findings**

Research indicated general education teachers with limited knowledge of instructional practices in ADHD might use a relatively small number of appropriate academic interventions (Barkley, 2016; DuPaul & White, 2006; Visser et al., 2015). Moreover, general education teachers continue to lack ongoing support to implement changes and refine instructional practices to meet the educational needs of students with ADHD (Barkley, 2016; DuPaul & White, 2006; Visser et al., 2015). Providing additional PD to general education teachers provided students with ADHD the academic and behavioral tools needed to be productive in school. The expected findings of this single case study were to find a significant change in teacher knowledge of ADHD and teacher perception of ADHD. It was also expected to find a positive impact on the behavior and academics of students with ADHD based on teacher participant interview responses and notes shared from the monitoring checklist.

### **Ethical Issues**

For this single case study, ethical concerns are addressed that included the purpose of the study, risks, benefits, confidentiality, and informed consent. Teacher participants could withdraw from the study at any time without any consequence. The purpose of the study, in addition to the risk and benefits, was given to all teacher participants of this single case study. Consent forms explaining their rights of privacy and confidentiality of the study were also provided to teacher participants.

Confidentiality was obtained throughout the study as teacher participants participated in online surveys. Survey data was stored in a secure file protected with a username and password. Teacher participants' checklist monitoring tool was written in a coded manner to ensure no identification of the student, such as legal name, nickname, or student identification number. An

alphabet system that did not correlate with the student's initial (student Z) or number system (student #1) was utilized to ensure confidentiality of the student. Teacher participants and the administrators from both elementary campus study sites were fully informed of potential ethical issues through the informed consent process. Additionally, their role in the evaluation study and their rights to decline participation in the single case study and non-disclosure of identifying results were discussed.

### **Limitations, Delimitations, and Assumptions of Study**

#### **Limitations**

Time and other campus or district mandates was a limitation for implementing some of the research-based instructional and behavioral strategies for students with ADHD after the web-based PD training. There were varying levels of implementation of the research-based instructional and behavioral strategies as learned in the web-based PD training for working with students with ADHD. Frequency and type of strategy implemented were determined by the needs of the individual students with ADHD. Purposive sampling also limited the study to a small sample size of participants from two elementary schools that meets set requirements by the researcher to participate in the study.

Considerable research has shown that some bias in qualitative research is unavoidable. In an effort to clarify researcher bias from the outset of the study, Merriam (1988) advised the researcher to communicate any past experiences, biases, and orientations that may have shaped the interpretation of data results and approach to the study. The researcher of this current study occupied several educational roles in the field of education for 14 years. As a former teacher of 10 years, the researcher has experienced the challenges that many teachers face when struggling to meet the academic and behavioral needs of students with ADHD amongst other learning and

conduct disorders. As an academic specialist, the researcher has encountered teachers who sought assistance in ways to differentiate instruction for students with ADHD. In addition, behavioral interventions were sought after to help decrease the loss of instructional time due to redirecting hyper-impulsive behavior by students with ADHD. Hence, the researcher was sensitive to the participants as they voiced their frustrations and concerns. During the implementation of the two elementary campus sites of study, the researcher did not observe any teacher participant's implementation of strategies with students that have ADHD. However, the researcher did keep in communication with all teacher participants task completions for the study and was accessible for any questions or concerns had during the course of the study. In addition, documentation was used as a monitoring tool for teachers to record and provide notes of the strategies being implemented with the selected students, student reactions, and other experiences that occurred during the implementation.

As the researcher and creator of the web-based PD, and as one with a vested interest in the success of the program, much effort was made to lessen the impact of biases in the data analysis. Four of the six teacher participants were teachers of a different campus from the researcher's current campus, which helped to minimize participant biases. Purposive sampling of teacher participants reduced bias due to the sample being refined to meet the purpose of the study. Triangulation of data and constant comparisons across teacher participants' responses from multiple sources were used to support the researcher's interpretations of the data findings: the open-ended task questions within the PD modules, semi-structured interviews, and surveys. Furthermore, member checks were conducted to allow participants to review and inspect their responses from the in-depth semi-structured interviews to reflect the accuracy of their own experiences.

## **Delimitations**

The single case study was delimited to the requirements set by the researcher for the participation in the study and the two elementary schools chosen for the study. The small sample size for the study limits the generalizability of the results. Additionally, the sample size for this study was anticipated to be small, consisting of only 6 to 10 second-grade through fifth-grade teachers to agree to participate in the study. Data sources, such as semi-structured interviews, documentation, PD modules open-ended task questions, and surveys also add to the narrow scope of the study.

## **Assumptions**

There were three assumptions for this single case study. The first assumption was that all teacher participants were honest in their responses to interview questions, open-ended task questions, the KADDS survey, and online PD survey. The second assumption was that all teacher participants would implement the various ADHD research-based instructional and behavioral strategies to the extent as outlined in the web-based PD training. Third, it was assumed that participating in the web-based PD and implementing the various strategies as presented in the PD would curve teachers' mindsets to be more reflective in utilizing essential research-based instructional tools for teaching students with ADHD.

## **Summary**

This chapter was an overview of the single case study. Data instruments such as interviews, surveys, PD modules open-ended tasks questions, and documentation were used to examine teacher perception of the learning from the web-based PD training on ADHD. In addition, the triangulated data sources examined how teachers used the research-based strategies learned in instruction, and to identify trends in teacher knowledge of ADHD before and after the

PD. The next chapter contains data findings from the research questions and data instruments used in the study.

## **Chapter 4: Data Findings and Results**

The purpose of this single case study was: (a) to examine teacher perception of the learning from the professional development (PD) training on attention-deficit hyperactivity disorder (ADHD), (b) identify how teachers used the research-based strategies learned in instruction, and (c) to identify trends in teacher knowledge of ADHD after the PD. Second-grade through fifth-grade teachers from two elementary campus study sites were purposively selected to participate in a web-based (PD) on ADHD. The PD contained three embedded data sources: pre- and post-KADDS surveys that measured the knowledge of ADHD, open-ended task questions from PD modules, and an online Likert-scale survey at the end of the training.

Semi-structured interviews were conducted with teacher participants after completing two weeks of implementing the various research-based strategies presented in the web-based PD for teaching students with ADHD. Participants' responses to the interviews and from the PD modules open-ended tasks questions were analyzed to identify themes. The process of triangulation between different data sources was used to confirm and corroborate findings. The ATLAS.ti program was used to identify codes from the data.

The interview transcripts were carefully read and coded based on the statements and descriptive details presented using ATLAS.ti. Following, patterns and codes were noted and themes were identified. Next, the web-based PD survey Likert-scale responses and KADDS pre- and post-survey responses were analyzed in the Qualtrics data collection site. Open-ended responses from the online PD survey were also uploaded to ATLAS.ti and coded to find connections and categorical patterns with interview question responses. Maykut and Morehouse (1994) constant comparison analysis was used for coding, identifying general themes, and categorical patterns. Then, the teacher participants' documentation (checklist monitoring tool)



was carefully read and analyzed to validate and supplement other qualitative data collected, such as interview responses and the pre- and post-KADDS surveys. Lastly, the codes from each of the uploaded documents in ATLAS.ti were grouped in relation and analyzed again to identify emerging themes.

### **Research Questions**

The research questions for the study are as follows:

1. What is the perception of teachers concerning the learning from the professional development training on ADHD?
2. How did teachers use the research-based strategies learned in the professional development?
3. What were the trends noticed in teacher level of knowledge as indicated in the KADDS survey before and after the professional development training?

### **Description of the Sample**

There were 10 second-grade through fifth-grade teachers from the two elementary study sites who qualified for the study. Qualifications for this single case study included: (a) teaches second, third, fourth, or fifth grade at one of the two school sites for the study; (b) currently has one or more years of teaching experience; (c) instructs students in their classroom diagnosed with ADHD in the fall semester of September 2017; and (4) did not have any PD training on ADHD prior to the current school year. Teachers also needed to be willing to participate in the training and use strategies from the training in their instruction. Out of the 10 qualifying teachers, six teachers agreed to participate in the study and signed consent. The six teachers' demographic characteristics of teaching experience, ethnicity, and grade level are shown in Table 3.

Each teacher participant completed all components of the training: by providing consent to be part of the study, participation in web-based PD, completion of all surveys, and implementation of strategies with a select number of students diagnosed with ADHD whom they currently teach. Furthermore, all teacher participants fully participated in the interview. In the semi-structured interviews, the teachers discussed findings from their anecdotal notes from the checklist-monitoring tool. In addition, the teachers discussed experiences from implementing various strategies learned from the web-based PD with the select number of students with ADHD they currently teach. Table 3 includes a summary of the participant demographics. Pseudonyms were used for each teacher participant to conceal identities.

Table 3

*Demographic Characteristics of Participants*

| Participants | Grade Level | Content        | Teaching Experience | Special Education Teaching Experience |
|--------------|-------------|----------------|---------------------|---------------------------------------|
| Roxy         | 2nd         | Self-Contained | 0-3 years           | None                                  |
| Opal         | 3rd         | ELAR           | 4-7 years           | None                                  |
| Farrah       | 3rd         | ELAR           | 4-7 years           | None                                  |
| Joan         | 4th         | ELAR           | 12-15 years         | 4-7 years                             |
| Naomi        | 4th         | Math/Science   | 0-3 years           | None                                  |
| Leslie       | 5th         | ELAR           | 8-11 years          | 4-7 years                             |

## KADDS Survey Findings

The KADDS survey provided information of teacher participants' level of knowledge with ADHD in three areas: general knowledge of ADHD; symptoms and diagnosis; and treatment. Teacher participants' pre-KADDS overall percentage score of items answered correctly was 57.6%, which indicated a moderate level of knowledge of ADHD. Post KADDS overall percentage score of items answered correctly was 60.6%, which reflected a slightly higher moderate level of knowledge of ADHD. The pre- and post-KADDS surveys overall knowledge of ADHD percentages is presented in Table 4.

Table 4

### *Summary of Pre- and Post-KADDS Overall Knowledge of ADHD*

|      | Correct Responses | Incorrect Responses | Don't Know Responses |
|------|-------------------|---------------------|----------------------|
| Pre  | 57.6              | 20.5                | 21.7                 |
| Post | 60.3              | 22.6                | 14.1                 |

*Note.* Teachers' pre-and post KADDS overall percentage score of the correct, incorrect, and don't know responses.

Participants' responses were grouped by the three KADDS subscales to examine teachers' knowledge within each of the KADDS subscales. The first subscale, *general knowledge*, assessed the knowledge of general information about the nature, causes, and prognosis of ADHD with 15 question items. About half of the subscale questions on general knowledge were answered correctly on the pre-KADDS survey and a slight increase of 6.7% on the post-KADDS survey. Less than half of the teacher participants answered the following questions correctly on the pre-KADDS survey: 1, 4, 6, 27, 28, 30, and 33. Less than 50% of teacher participants responded correctly to questions 1, 4, and 30 of the post-KADDS survey.

Teacher participants' percentage of responses from the pre- and post-KADDS subscale, *general knowledge*, are shown in Table 6 (see Appendix F).

The second subscale, *symptoms and diagnosis*, consisted of nine question items to assess the knowledge level of ADHD symptoms that may lead to a diagnosis of ADHD. The participants' overall percentage of correct responses on the post-KADDS survey was 81.4%, which indicated a 9.2% increase from the pre-KADDS survey. Specifically, the percentages of correct responses from questions 5, 11, and 21 from the subscale, symptoms and diagnosis, increased after participating in the content modules of the web-based PD. Teacher participants' responses from the pre- and post-KADDS second subscale, symptoms and diagnosis, are shown in Table 7 (see Appendix F).

KADDS third subscale, *treatment*, used 12 question items to assess the participants' knowledge of ADHD medical and psychotherapy treatment. Participants correctly responded to 62.5% of the treatment subscale questions on the pre-KADDS survey but decreased 5.6% on the questions 12, 18, 25, and 34 of the post-KADDS survey. Teacher participants' responses from the pre- and post-KADDS on the third subscale, treatment, are shown in Table 8 (see Appendix F).

The post-KADDS showed an increase in the number of correct responses from teacher participants in the subscale areas of general knowledge and symptoms/diagnosis. The pre- and post-KADDS surveys indicated teacher participants responded correctly to more than 70% of the question items in symptoms and diagnosis with lower correct responses in general knowledge. The number of correct responses in the treatment subscale was slightly lower from the pre-KADDS to the post-KADDS survey. Teacher participants' pre- and post-KADDS subscales percentage of responses are presented in Table 5.

Table 5

*Pre- and Post- KADDS Subscales Percentage of Responses (N = 6)*

| KADDS Subscales           | Percentage of Responses |      |      |      |      |      |
|---------------------------|-------------------------|------|------|------|------|------|
|                           |                         | C    |      | I    |      | DK   |
| General Knowledge         | Pre                     | 51.1 | Pre  | 26.6 | Pre  | 22.2 |
|                           | Post                    | 57.8 | Post | 28.9 | Post | 12.2 |
| Symptoms and<br>Diagnosis | Pre                     | 72.2 | Pre  | 20.3 | Pre  | 7.4  |
|                           | Post                    | 81.4 | Post | 11.1 | Post | 7.4  |
| Treatment                 | Pre                     | 62.5 | Pre  | 12.5 | Pre  | 25   |
|                           | Post                    | 56.9 | Post | 23.6 | Post | 19.4 |

Note. C= Correct Response percentage, I= Incorrect Response percentage, DK= Don't Know percentage, Pre= Pre KADDS results, Post= Post KADDS results.

### **Web-Based Professional Development Survey Findings**

The web-based PD survey consisted of 10 questions on a 5-point Likert scale regarding the content and delivery of the web-based PD and 6 open-ended questions. The web-based PD survey indicated that each teacher participant felt the training enhanced their understanding of ADHD and helped them gain new information and skills about teaching students with ADHD as shown in Table 9 (see Appendix G). Results from the web-based PD survey also revealed that 83% of the teacher participants felt the web-based PD was well planned, interactive, purposeful, and applicable to their needs in making instructional decisions when teaching students with ADHD as presented in Table 9 (see Appendix G). Teacher participants' responses to the open-ended questions from the web-based PD survey are shown in Table 10 (see Appendix H).

The web-based PD survey six open-ended questions were anonymous answered by teacher participants. When teachers were asked what the most useful part of the web-based PD was, results indicated learning about research-based instructional and behavioral strategies for teaching students with ADHD. A participant commented:

ADHD can look and feel different to different people. So just because one student with ADHD acts a certain way, another student with ADHD may act the complete opposite, but that is because this disorder is not a one size fits all. Every student is different and will need different teaching because of that.

Additionally, when asked if training for teachers on best practices for students with ADHD is needed, results indicated each of the teacher participants felt there is a need for training on best practices for teaching students with ADHD. One participant stated, “There are too many students with this disorder for teachers to not have access to more training.” In agreement, another participant conveyed, “Yes, I feel that for us to be better teachers, we need to have an in-depth understanding of how to help students with ADHD as well as other behavior disorders.”

When asked what teacher participants perceived to be the least useful of the web-based PD, 5 of the 6 participants perceived all components of the web-based PD to be useful. However, one participant stated, “Some of the smaller "cartoon" video clips weren't as helpful, but I did like that they used real student interviews.” All participants perceived to be satisfied with the web-based PD and perceive the information useful as indicated by the web-based PD survey Likert-scale questions and open-ended responses.

### **Emerging Themes**

Five themes emerged from the coding of the interviews and the web-based PD modules open-ended task responses. The findings are described below.

#### **Theme 1: Academic Challenges**

All teacher participants shared that students with ADHD have academic challenges. The academic challenges were then broken down into subthemes: reading/writing challenges, student frustration, and task completion behaviors. Each participant indicated that at least one student

diagnosed with ADHD in their class was one or two grade levels below their expected level or current grade and struggled with reading fluency and comprehension.

**Reading/Writing challenges.**

Joan indicated:

Student 2 has a first-grade middle of year reading level. Because they were behind a lot of times and below 2 or more grade levels, I began giving them credit for the portion of the task that they were able to accomplish, given the fact they had ADHD. . . . They cannot attend to more than a page or do anything on their own. It has to be short paragraphs, quick, and an immediate response . . . they have a hard time reading without making types of errors like miscalling words and not being able to read and think at the same time.

Farrah stated:

Academic wise she was really low. One thing I noticed about her is when she reads, she reads with so much authority. She is such a good reader, but everything else. . . . She would read the whole page and when I ask her what the story was about or a question about that page, she would just look at you like, what. Like she never read it. And I would always tell her, “Honey, you read so well!” I think that something is just not clicking.

Leslie discussed:

His penmanship, you couldn’t understand anything that he wrote. It was not legible, so he would fight everything you said, which led to the student being argumentative.

Naomi shared:

Academically he manages to achieve with his peers in math. However, his reading is below his fourth-grade peers.

**Student frustration.**

Opal shared:

One student becomes very frustrated and becomes verbal about it. When she gets frustrated, she just shuts down, and you have to bring her back and start over... I would work with the rest of the students and then come back to check on this particular student, and the student would be three steps behind and frustrated . . . sometimes she cries or sometimes you can tell she feels bad . . . I don't put her with people a lot because she will begin to argue if they are not on the same page.

Joan expressed:

I feel they [ADHD students] are thinking: I can call the words or I can think, but which one. And if I think, the fluency is going to go down. If you just allow me to read and not ask what anything is about, I can read beautifully.

**Task completion.**

Joan described:

I know on one particular day, for one task I noted four different times I had to tell her to get started, or redirect her. . . . It was independent work, she was sitting at her desk, and she just could not sit the entire 20 minutes to complete the independent work on her own without getting up or without conversing with somebody or doing something other than attending to the task. Also, academically not completing assignments or can't and failure to get started so that I couldn't even give her credit for completing a portion of it because she couldn't even get started. Yep, so it would be impossible for her, and for me to



expect for her to finish. I think that has been the biggest academic stressor for me as a teacher. Prior to the training, I would not lower my expectation that they can finish an entire, or any task. So, I begin to use the part that they could complete, as far as modification of assignments . . . and giving them credit for the portion of the task that they were able to accomplish given the fact that they had ADHD.

## **Theme 2: Teacher Beliefs**

What arose from the semi-structured interview questions were teacher beliefs. The teacher beliefs related to teacher participants backgrounds or past experiences that have contributed to their knowledge of ADHD and personal thoughts about ADHD. The researcher categorized the teacher participants' beliefs in regards to ADHD in the following subthemes: awareness, teacher background, misconceptions, and assumptions.

### **Awareness.**

Opal expressed:

We know that it is a medical issue and we know that it is challenging, but we don't really think about the science behind it and what causes those reactions in their heads. So that was really eye-opening! I don't think I really appreciated how hard it was for them to control it. We need to be building our tool bag and have something mentally we can pull out and try with this kid or that kid. I think as a campus we should be more mindful because we're passing these students to someone else.

Farrah commented:

I don't think I ever had any class on ADHD or how we can help them, like the web-based PD. . . . When we meet with parents, I want to share with them that something is not right about your kid, but we're not prepared to talk about it.

As a response to an open-ended question in the web-based PD, participants anonymously commented. One participant stated, “I think this [PD] will help me become more patient with my students and now I have some tools to implement that I didn’t have before. Hopefully, this will decrease mine and the students’ frustration in the classroom.” The second participant noted, “A better understanding of the reasoning behind what causes ADHD as well as what I can do as a teacher to better the student’s learning experience.” A third participant commented, “Finding ways to encourage students to focus on things they are interested in while teaching the objectives is a first step into fostering growth for students who struggle with ADHD.”

### **Teacher past experiences.**

Farrah expressed:

They never really prepare us what to expect with the kids on how to deal with them in the room. I had a class about it but never went in depth in college about it or an example of what to expect in the classroom. I never recall having an example of this is how the kid with ADHD will act in a classroom. You just learn more about the definition and what it stands for.

Leslie discussed:

This is my tenth year. Probably every school year I’ve had at least two students who were 504 with ADHD, at least two. I’ve done some of my own reading and research about ADHD . . . maybe a 30-minute read here and there.

Opal expressed:

For me, I think a lot about ADHD is how I was raised. We didn’t really have a lot of ADHD kids in my days because they were punished and they did better; there was no

label for it... Through my teaching experience, I have seen a lot of teachers who don't have any coping mechanisms for those kids (ADHD students).

As a response to an open-ended question in the web-based PD, one participant anonymously stated:

I've had some really trying interactions with students, and more than once lost my patience. I try to always start with a clean slate every day. With that being said, I try to learn from those encounters and not take it personally when a student is struggling to sit still and/or follow along. I find that giving these students a job helps a little. If they have a purpose in the lesson or classroom, they tend to be more willing to put forth the effort. I have also found that discussing with the students, how I can help them, encourages them to communicate better with me and helps me to be more aware of when they need a break.

#### **Assumptions and Misconceptions.**

Opal stated:

I know that it is legitimate in some cases, but I do feel like in my mind they can't all be ADHD, but it is a discipline thing. I feel like it is an over-diagnosed thing. I feel like if they could just go play outside, maybe they would feel better, I don't know.... I would just assume that they will do what I tell them to do, but they don't, and I just get upset and frustrated.

Leslie asserted:

We can try all these different strategies and all these different approaches, but I still see that [disruptive behaviors] because they are still constantly being stimulated. So, either have teachers that are more patient and tolerant of that [disruptive behaviors], or they

need to be out of the classroom. Because that is where we're going, it's completely virtual. I think a lot of it has to do with constant stimulation.

### **Theme 3: Positive Teacher Interactions**

Teacher participant responses revealed a common experience of when they are not redirecting disruptive behavior and are able to positively interact with a student with ADHD; there is a positive change in confidence and motivation. The data of responses allowed the researcher to also identify subthemes for positive teacher interactions with students and parents, which are: feeling supported, student confidence, and student motivation.

#### **Feeling supported.**

Roxy stated:

I think he was quite shocked that a teacher was doing this with him instead of just immediately getting on to him... He wants them [peers] to help him, and he works fairly well with them.

Leslie shared:

Even if it was a slight change in behavior, I was able to give them [parents] specifics, not just, "they misbehaved today," and then, we were able to have some really good dialogue... And it actually changed the behavior after a while. It took time, but as I said, the parents were receptive once they saw that the parent and I were on the same side... they couldn't try to play us and say, "Oh, she just picks on me... she doesn't like me!" No, this teacher cares, so the parent took more of an action on it.

Farrah proclaimed:

So, I was very surprised by two of my students with ADHD parents' responses to the

Daily Report Card (DRC). They were very positive. They accepted it because it had positive things as well as negative behaviors because I really emphasized the positives to start off... it seems like I won them over.

### **Student confidence.**

Opal shared that two of her students with ADHD began to show confidence just from the attention of the teacher in finding ways to help them be successful:

I think they liked the attention, to be honest with you. I feel they liked the time I was taking to get to know how they function. Student 1 appreciates me taking the time to actually say to her, "What can I do to help you?" ... Student 2 just like the attention in general. I have to let him on I-station because he is more focused. I have created a chart for everybody to see where they stand monthly, and for him, he just blew me away. I had a one-on-one conversation with him, "Look at how you did this month, which tells me that you are capable of doing it." So that helped build up a little confidence, and he smiled like, "Ooh, I can do this!"

Farrah found that the confidence level of one of her students with ADHD increased with the use of the behavior intervention, DRC, as constant reinforcement:

He needed a star, and he was happy... He got a star for the day and like I say, I start off with all positives, even if he had some issues . . . I just really, really praised him for any little thing he did. With that, it seemed like I won him over. I found something that he was very interested in, and that became our thing (reward). I'll just say, "You're not getting a star today." and he would just get back on track and focus. He just needed that regularly, a constant reminder.

### **Student motivation.**

Roxy expressed, “Using the smiley chart twice a day really helped keep the student self-motivated. My student was more motivated to accomplish his goal. He was very happy with receiving his free time reward at the end of each week.” Farrah shared that the Daily Report Card led one of her students with ADHD to become more self-motivated to behave well. She commented:

Anything but positive marks on his Daily Report Card, he was in tears and would say, “I’m gonna do better tomorrow.” He would promise me, and that changed me in how I talked to him and treated him, and then he changed his behavior because he wanted us to be proud.

### **Theme 4: Teacher Efficacy**

Teacher participants’ responses during the interview presented perceptions of teacher efficacy and were categorized into two subthemes: disruptive behavior and teacher frustration.

#### **Disruptive behavior.**

Joan commented:

The random walking, just out of your desk. Maybe bothering another student that is on task and trying to work and the impulsivity. It's clear you maybe not have intended to do it, but you just might strike out and hit somebody, or bump somebody, or jump on top of something where you shouldn't to the point where it is a detriment to you or someone else.

Leslie asserted:

Most of the time they have trouble following directions, listening, but staying in their seat was probably the biggest one... The outburst, uncontrollable outburst, lack of attention,

but mostly I can say not being able to remain seated and focused during lessons. A lot of times when I noticed those behaviors, I would usually have them sit in an area where they are less distracted and pretty much allow them to stand or sit in a comfortable area to work on lessons.

Leslie described:

He was argumentative. He had sound effects that were just out of the blue, unnecessary, meow like a cat or bark like a dog and was really seeking a lot of attention. And at that time, I didn't have that kind of time for him, on top of his reading being at kindergarten level. . . . So, if you said, "Get in line," he would say, "I am in line" . . . Just a defiant disorder on top of his ADHD. He was a walker, and every 20 minutes he was up or needing to go to the restroom. He would touch someone or tap someone or trip someone. He would do a whole lot of stuff. So, by 9:05 he was out of my room. This went on for a while.

Student 2 had the hair shakes. I cannot explain it... he would just shake his hair, spin around in circles while sitting, and standing in line. He would just do his spinning and shake his hair. He would get put out the room too. One day we were taking a test, and he wouldn't stop shaking his hair, so he had to take his test in another room. Also spinning and flying pencils.

Opal noted in general, disruptive behaviors such as, "unable to sit still, fidgets, knocking on stuff, and humming" exhibited from students with ADHD in her teaching experience:

He calls out, crawls under things, hits, gets underneath things, disrupts a lot; and seems seeking attention. However, if you ever ask him to sit down and sit still, it's like he physically can't force himself. If you ever watch and say, "Sit down," he's trying, he just

can't... I can't just send him across the room to work with people because he hits. Even when I am teaching, he would just yell out for no reason.

Naomi commented:

Something as small as a pencil eraser can deter his entire lesson because he is so infatuated with it at that moment. He was my door holder at one point, but I had to replace him because he started to hit students as they walked past him.

Farrah stated:

I see a lot of more talking to others or playing with things... You have no idea how many toys I have gotten from being taken away from them. I'm like, didn't I take the same toy yesterday... Or like pulling off the nametags on the desks. One constantly gets up to go blow their nose... And I'm like you have nothing coming out, just sit down. I mean she constantly has to get up and blow her nose.

Farrah also recounted the disruptive behavior of two students with ADHD that directly impart negative encounters with peers:

He was all over the place, like bothering somebody or when they would be working individually, he would do something. I was on him for usually bothering somebody or playing with something. He always has something to play with. The other one, he tried to hide his bad side. But he is sneaky a little bit. He would say something hurtful to other kids, but I wouldn't hear it, and the other kids would tell me... And I'm like, "Are you supposed to say that?" . . . He tries to hurt other people with words and will hide and not admit that he did it.



**Teacher frustration.**

Naomi indicated, “I just knew I would get really frustrated when I would try to redirect a student, and they began to get distracted again.

Roxy shared:

I felt very overwhelmed to make extra time for my ADHD students. It is very hard to meet the needs of every student when you’re spending so much time trying to control behavior or motivation to work for the ADHD students.

Opal brings awareness and frustration of a student with ADHD who uses ADHD as a reason or excuse for acting out:

Like he has it [ADHD] and has been told (not by me) this is why you act this way and its okay, and he uses it to his advantage to get away with some of the things he does. I think it is frustrating because I ask him about his behavior and he can tell me exactly what was wrong and why it was wrong but continues to do it.

Naomi stated:

A lot of time was spent redirecting them or helping them to monitor their behavior.

Behavior is unbelievable, so it just eggs him on I feel, and I am quick to discipline due to all of the other things going on as well.

Leslie shared:

At the beginning of the year, my patience and tolerance with his behavior were at zero. I kept putting him out of the class, seriously, every single day. We would rotate at 9:00, by 9:05 he was out. This went on for a while. And so, I knew what his problem was, but I had so many in the class, my patience for it wasn’t there. Maybe the training wasn’t there, I don’t know.

Additionally, three teacher participants discussed frustration with disruptive behaviors of ADHD students and lacking the skills to intervene effectively.

Farrah stated:

They never really prepare us what to expect with the kids on how to deal with them in the room. Yeah, we know this kid has ADHD, but we don't have any tools, how can I work toward looking past what they have... now what, because we cannot force the parent to put them on the meds. We need something that will help us as teachers on how to deal with them in our classroom because I don't think we have that. I mean sending them to the office is not working. Or ignoring them is not working. So, we're the ones every day calling out their name. Stop this, stop that, and it's getting exhausting, so we need something that is at least manageable to help us help them.

Opal communicated:

There have been times when I didn't know what to do with students who are ADHD, and I would go to other people and ask, "What do I do, or tell me what to do!" ... I was never taught what to do in teaching students with ADHD. They don't teach you in college that much. They give you one class, some scenarios, best practices, and then they send you on your way; and no one ever does it until you find yourself in that situation.

### **Theme 5: Differentiating Instruction**

Teacher participants reported a common process with differentiating instruction for students with ADHD, which encountered trial and error. Leslie shared an account of a student with ADHD and the use of a peer tutor to aid in instruction, commenting,

Well for the peer tutor, they didn't notice it was for them only because it was a whole class thing. I made sure that I put my high kids who are not easily distracted with my

ADHD kids because I noticed the first trial, it didn't work because they both were off task and no work got done. So, I had to kind of play with that pairing because I needed someone who can stay focused even with someone tapping on the desk or if someone is under the table, which took place quite regularly... It varied, it really did vary depending on their day, my day, my tolerance for that day, if the lesson was hard. I mean it just varied each day. Some days the peer tutor worked, and some days it didn't.

In addition, Leslie implemented three different instructional strategies with an ADHD student to differentiate instruction, but only one was found to be most effective for the student. She stated:

Peer tutor worked. I tried him on the computer also, but for him, the hands-on was the best, which was regularly using the interactive notebooks. I've done twitter, where they summarize the lesson and put it on the board with a hashtag and all that. It was something they like doing like writing a text message or sending a tweet. Outside of that, the peer tutor didn't work as much.

Farrah noted:

I remember one of the lessons we did was like the biography or autobiography of reading a passage and acting it out. They did it as a table, in which I was impressed in seeing how they did it. And I remember hearing one of them, like really getting into the conversation saying, "No, this is a biography because of this and that..." and I called on him and was like, "Wow, I like listening to what you said about this and that" ... I was just trying it out to see... I try at least for two weeks the same strategy. I'll do Monday-Thursday because that gave me the chance to rotate to see how they're doing with it [the strategy].

## **Research Questions Findings**

### **Research Question 1**

What is the perception of teachers concerning the learning from the professional development training on ADHD?

### **Survey Findings**

The web-based PD Likert scale survey indicated that all of the teacher participants strongly agreed the training enhanced their understanding of ADHD and helped gain new information and skills about teaching students with ADHD. Results from the web-based PD survey also showed that 83% of the teacher participants strongly agreed the web-based PD was well planned, interactive, purposeful, and applicable to their needs in making instructional decisions when teaching students with ADHD. Teacher participant responses from web-based PD survey open-ended questions revealed teacher participants felt the most significant learning from the web-based PD was the understanding of how the brain works in someone that is diagnosed with ADHD in comparison to someone not diagnosed with ADHD. In the web-based PD survey, a teacher participant anonymously indicated their feelings in the following way, “For me to be effective in working with ADHD students, I need to actually spend time understanding the student's state of mind.” Another teacher participant anonymously expressed in the web-based PD survey learning how ADHD can be exhibited by children in many different ways, stating:

ADHD can look and feel different to different people. So just because one student with ADHD acts a certain way, another student with ADHD may act the complete opposite, but that is because this disorder is not a one size fits all. Every student is different and will need different teaching because of that.

The web-based PD survey is presented in Appendix B. Participants' responses to the web-based PD Module 4 final tasks responses are presented in Table 11 (see Appendix I).

### **Teacher Reflection Findings**

Teacher reflections from interviews and the web-based PD modules open-ended task questions concerning the learning from the professional development training on ADHD are included below. Teacher participants stated the following:

I do think it gave me more to think about... but we don't really think about the science behind it and what causes those reactions in their heads. So that was really eye-opening to me. Since the study, I have been giving a lot more opportunities for them to do more with their hands and giving them more time to discuss and move around and it has helped.

[The web-based PD] was really valuable and I think it gave me a lot more information about the brain of a student with ADHD than I previously knew. I think it is important for teachers, really anyone who works with people with ADHD to truly understand what is happening in order to best meet that person's needs.

I think it should be a course for the beginning of the school year training or even continuously throughout the school year. You have your 504 kids who get certain accommodations for testing, but I just think it's not enough to really help them to be successful and level the playing field.

I thought it was valuable because it gave you different ways to look at ADHD as a whole. You can see the value in the person and not the part that seems destructive or disruptive.

I think I just dealt with the situation like I would any other student. I just knew I would get really frustrated when I would try to redirect a student, and they began to get distracted again. I definitely feel like I have a better understanding of ADHD. I think every child is different, even if they have the same diagnosis, so really implementing these strategies is a case by case basis. I do feel like I have more tools in my toolbox going forward to be proactive with students with ADHD.

I think the web-based training shifted my perspective completely. Then I shifted to what can I do with them, given the nature of the disability, so I think that was the biggest change.”

Learning from the TED presentation helped me to understand more fully, what it's like for those who struggle with ADHD and that we need to find better ways of helping these students. There needs to be more training and a better understanding from teachers.

I feel a lot more equipped because I have a better understanding of ADHD that it is not just behavior and it's not as easy for someone with ADHD to regulate it. It is definitely differences in how their brain is functioning and how they perceive things.... I have 2 ADHD diagnosed students, but several who exhibit the same behaviors or characteristics of ADHD. So, the other students in the class that exhibit some of these same behaviors of ADHD students, I am trying some of these strategies with them so that they can find a different way of reacting to stimuli so they can hopefully focus a little better.

## Research Question 2

How did teachers use the research-based strategies learned in the professional development?

**Peer Tutor.** Teacher reflections and discussion from interviews of using the peer tutor researched-based instructional strategy presented in the web-based PD training are included below. Teacher participants stated the following:

Peer tutor was typically used in Social Studies to help her [ADHD student] with any academic words that she ran across, and as long as there was an activity attached to it that wasn't necessarily a paper pencil tasks, she could attend to it.

When students with ADHD have a peer tutor they can trust or talk to, they express more and do a little more work. I would just put them in a corner and see how well he worked and he was completing his work when he was working with a partner, but when by himself, nothing got done.

Peer tutoring did not work with Student 1 due to lack of social skills. I don't think he learned how to talk and be friends and socialize with other students. Because of his other behaviors, I think that isolated him from other kids and because he's the only child. He doesn't know how to interact with people and don't understand boundaries.

Peer tutor and it was done daily.... My students were able to ask their peer tutor questions about the assignments throughout the day. This was really helpful for when my students would return from speech pull-outs.

Like one of them, he was looking forward to that every time for peer or partner work, it was like, “Oh, am I going with her again?” It was something that he was looking forward to.... Yeah, he could do it, but he needed someone... like the partner I gave him, she was one of those pushy, like, “Get it done!” and he would be like, “Okay, okay, let's do it!” and when they finished he would be so proud of himself of completing the task because he felt like, “Oh yeah, we finished... I finished the work!” Student 2, is a little different . . . working with a peer tutor and the instruction is different.... I am not having to prompt him or give him a consequence for being off tasks. So that typically works, especially during my Guided Reading time when he is not with me, as long as he's doing that, he's okay.

Overall, teacher participants reflected on how the peer tutor instructional strategy was used with ADHD students and any improvements observed in attention and task completion.

**Educational Technology/ Computer Assisted Instruction (CAI).** Teacher participants referenced implementing educational technology, such as Google Classroom and Edmodo, two to three times a week. Google Classroom and Edmodo were used as a supplemental learning tool for collaborative learning, assigned tests, and social networking in academic content discussion boards. Teacher participants referenced using CAI as a tool to reinforce taught skills and allowing the student to practice applying the skill at their academic level. Four online educational programs were reported as being utilized for CAI: *Spelling City*, *IXL*, *Istation*, and *Raz Kids*.

Teachers also reported depending on the academic level of the student with ADHD, CAI was also used during whole-group lessons if the lesson was above the reading and comprehension ability of the student. One participant shared an account of a student's reaction



to CAI, stating, “She’s learning and don’t even realize it. The stimulated movement is what is keeping her engaged because she has to focus on that, and the outside stimulation is not getting to her as much.”

**Teacher Think-Aloud.** Teacher reflections and discussion from the interview of using the teacher think-aloud researched-based instructional strategy presented in the web-based PD training are included below. Teacher participants stated the following:

If we were writing about a time that you were scared, I would tell them to close their eyes and just think about the time you were scared, think about what you were feeling. I would use a lot of sensory language. Think about what you were thinking at that time, think about the sounds that you heard, think about who else was there and what they said. That might take two minutes or so, now open your eyes. That always seems to get her to generate more ideas and be on task again and normally able to write without having me to give some consequence for being off task.

To start off like the beginning of a lesson of a big event, I would start off with a think aloud showing them what is expected, but then after that, I moved away from that and just went over it with them and guided as needed.

I would give a whole group lesson, a writing assignment, and show what I am expecting as I go through the writing process. I explain the steps whole group, model it, then get my own sheet of paper and write out what my expectations are for the pre-write. Then allow the students to work on their own, but those [ADHD students] are the ones I know

have trouble focusing, they don't have to work on their own just yet... I kind of walk them through it as they are beginning their lesson.

When it comes to problem solving in math I use a lot of teacher think-aloud and visualization already so it was great to see these strategies as a tool for students with ADHD. We problem solve in math every day with a problem of the day. Typically, on Monday I will do more of the modeling and thinking. Tuesday, the problem is similar to Monday so that students can use the strategy modeled for them.

Collectively, teacher participants reflected on how the teacher think-aloud strategy was used with ADHD students in the subject area of writing and math. Additionally, teacher participants noted progress in various writing elements of the writing process with ADHD students.

**Daily Report Card (DRC).** Teacher reflections and discussion from the interview of using the DRC researched-based behavioral strategy presented in the web-based PD training are included below. Teacher participants stated the following:

I learned about the daily report card. I like this strategy because it allows communication between parents and teachers. I also like it helps us track the students' progress on a daily basis. It also helps boost students with ADHD confidence that they can do better than others expect of them.

Daily Report Cards sounds like something I would like to use or try. Especially for my students who turn in blank work that we have worked on for an entire week. They end up needing so much "think time" that turns into "daydream" time. I think if I could give them a report card each day, which may possibly motivate them to do better (especially if I could get parents on board).

If we decided that staying on task was our focus area, then for 30 minutes I would monitor that child or have my T. A. [teacher assistant] help with that because I'm focused on teaching the lesson or in a small group. So, they are able to monitor every 30 minutes, what they are doing, and rank it with four being on-task and one being not on-task and then do that throughout the day, then meet and discuss it. This is what I saw you doing... don't harass the kid if they're not disrupting. Just keep on monitoring. They know you're monitoring them, but they can't help it. So, they're not going to fix the behavior even when they know you're watching.

At the end of the day have a discussion with them, this is what you were doing. You got a three because you left your desk, or didn't complete the assignment, or playing with your pencil. Whatever it is, be very specific in letting them know what behavior to work on.... Even if it was a slight change in behavior, I was able to give them specifics, not just they misbehaved today and then we were able to have some really good dialogue. And it actually changed the behavior after a while. It took time... the parents were receptive once they saw that, the parent and I were on the same side. They couldn't try to play us and say, Oh, she just picks on me... she doesn't like me! No, this teacher cares, so the parent took more of an action on it. It is very time-consuming.

The daily report card I thought was a really great visual for the student to see every day. The only trouble I found with it was time and remembering since it was something new for the student and I... He really liked the daily report card to see his progression or regression from day to day.

My student was more motivated to accomplish his goal. He was very happy with receiving his free time reward at the end of each week. I think he was quite shocked that a teacher was doing this with him instead of just immediately getting on to him.

For some kids it worked, for others, it didn't because some parents did not support it, didn't care, and you could tell from those kids it came back, nothing changed. So, I was very surprised by two of my ADHD student's parents' response to the daily report card. They were very positive. They accepted it because it had positive things as well as negative behaviors because I really emphasized the positives to start off, it seems like I won them over.

As shown above, teacher participants reflected on how the DRC behavioral strategy was used with ADHD students and improvements or lack thereof observed in attention, behavior, and task completion.

**Self-Monitoring Chart.** Teacher reflections and discussion from the interview of using the self-monitoring researched-based behavioral strategy presented in the web-based PD training are included below. Teacher participants stated the following:

I used a daily smiley chart for behavior. The student and I would meet for 1 minute in the morning to go over that week's goal. For example, I will keep my hands and feet to myself at all times). We would then meet mid-day to discuss what the student thought about his behavior from the morning. A smiley face would be worth 10 points, a straight face would be 5 points, and a frown face would be zero points. I would allow the student to choose what behavior they thought they displayed with honesty.

We would review each afternoon again and add up the points of the day together. If the student reached their point goal at the end of each week, he would receive some free time of his choice. The behavior chart was shared with the parent at the end of each week.... I found that using the smiley chart twice a day really helped keep the student self-motivated. I believe it was effective because he typically never earned free time in class due to it being too difficult. It also served as a great reminder throughout the day for him to accomplish his goal.

I mean I tried the other ones that were there, like the self-monitoring and self-regulation. A lot of times they don't even realize they are doing those behaviors. You can kind of redirect them, but sometimes they just didn't know. For the ones who were a little more mature, I had them to self-monitor, and a check-off list of how did you do today.

Overall, teacher participants reflected on how the self-monitoring chart behavioral strategy was used with ADHD students with the addition of a reward system and any improvements observed in behavior.

### **Research Question 3**

What were the trends noticed in teacher level of knowledge as indicated in KADDS survey before and after the professional development training?

The trends noticed in the teacher participants' level of knowledge in ADHD were all teacher participants' number of correct responses had a moderate increase in the subscale of symptoms/diagnosis (see Table 5). The KADDS subscale, general knowledge, increased 6.7% after participating in the web-based PD training on ADHD (see Table 5). The subscale, treatment, had the highest percentage of "don't know" responses from teacher participants on the

pre- and post-KADDS survey. Overall teacher participants answered more correct answers on the post-KADDS survey after participating in the web-based PD on teaching students with ADHD.

#### **Chapter 4: Summary**

This study was designed to reveal teacher participants' perception of the web-based PD for teaching students with ADHD in gaining knowledge of ADHD and how teachers used the research-based strategies in instruction. It also allowed the discovery of trends in teacher knowledge of ADHD after the web-based PD. From the gathered data, five themes emerged: academic challenges, teacher beliefs, positive teacher interactions, teacher efficacy, and differentiating instruction. These themes described the varied perceptions of teaching experiences with students that have ADHD.

Findings indicated teacher participants' overall knowledge of ADHD had a slight increase even with having some general knowledge of ADHD prior to participating in the web-based PD training. Responses from teacher participants also indicated some components of the web-based PD were more significant and useful than others. Chapter 5 contains the analysis of the findings and the significance of the results. Findings related to previous research will be discussed, suggested practical implications, and the need for future research.

## **Chapter 5: Discussion and Conclusion**

The Center for Disease Control and Prevention (CDC) 2015 statistics reported nearly 6,000,000 children in America are diagnosed with attention deficit-hyperactivity disorder (ADHD). The ratio of students with ADHD in a classroom is on average 3:1 and students with ADHD exhibit disruptive behaviors that stifle the teaching and learning in the classroom (Barkley, n.d.). Moreover, teachers lack knowledge of ADHD and how to effectively teach and manage the behavior of students with ADHD (Barkley, 2016; Bradshaw & Kamal, 2013; DuPaul & White, 2006; Guerra et al., 2017; Martinussen, Tannock, & Chaban, 2011; Sutherland, Denny, & Phillop, 2005; Visser, Holbrook, Danielson, & Bitsko, 2015). Research has shown that teachers use few appropriate interventions and have limited resources and support of implementing research-based best practices to meet the academic and behavioral needs of students with ADHD (Barkley, 2016; DuPaul & White, 2006; Visser, Holbrook, Danielson, & Bitsko, 2015). Furthermore, pre-service and in-service training for teachers to acquire the knowledge of instructional skills and interventions for teaching students with ADHD has been rare (Barkley, 2016; DuPaul & White, 2006; Visser et al., 2015).

As a result of the research and needs found in the study sites for teaching students with ADHD, a web-based professional development (PD) training initiative was developed to provide teachers with research-based strategies for working with students diagnosed with ADHD. A case study was designed to examine teacher perspective of the learning from the professional development. The purpose of this single case study was: (a) to examine teacher perception of the learning from the web-based PD training in ADHD, (b) identify how teachers used the research-based strategies learned in instruction, and (c) to identify trends in teacher knowledge of ADHD after the professional development. The data analysis and evaluation results were shared with

the administration and campus instructional leaders to use for making informed decisions about relevant in-service training to meet the instructional needs of teachers and students with various academic and behavioral challenges.

Discussed in this chapter is a summary of results and research questions that guided the study. Data results are interpreted and discussed in connection with the literature presented in Chapter 2. Lastly, suggestions on providing ongoing PD for teachers and recommendations for future research are presented.

### **Summary of the Results**

This single case study was conducted at two elementary campus sites in the southwest region of the United States. The population for the study consisted of 48 second-grade through fifth-grade teachers who teach at the two elementary campus sites of study. Ten teachers were recruited who met the criteria for the study from the elementary study sites. The qualifying criteria used in the single case study included: (a) teaches second, third, fourth or fifth grade at one of the two school sites for the study; (b) currently have one or more years of teaching experience; (c) instructs students in their classroom diagnosed with ADHD in the fall semester of September 2017; and (4) did not have any PD training on ADHD prior to the start of the current school year. Six teachers volunteered and gave consent to participate in the study. The consent form explained the purpose of the study and various tasks related to the research. Each teacher participant completed the web-based PD and participated in the semi-structured interviews.

This study was guided by three research questions. The research questions were:

1. What is the perception of teachers concerning the learning from the professional development training on ADHD?



2. How did teachers use the research-based strategies learned in the professional development?
3. What were the trends noticed in teacher level of knowledge as indicated in the KADDS survey before and after the professional development training?

Data sources for this study were surveys, semi-structured interviews, documentation, and the web-based PD modules open-ended task responses. Descriptive statistics were used to describe and summarize the data from the surveys. Constant comparison method was used to analyze data from interview responses, open-ended survey questions, and identify thematic patterns from the data.

Five themes emerged from the triangulated data. The themes were academic challenges, teacher beliefs, positive teacher interactions, teacher efficacy, and differentiating instruction. Findings indicated teacher participants had a moderate level of overall knowledge of ADHD prior to participating in the web-based PD. After participating in the web-based PD on ADHD, teacher participants overall knowledge of ADHD had a slight increase. Teacher participants also indicated some components of the web-based PD were more significant and useful than others. The research-based strategies implemented with students that have ADHD were observed to be effective at times dependent on the student's needs and behavior.

### **Discussion of the Results**

The triangulated data for this study provided an understanding of the teacher participants' perceptions of the web-based PD training on ADHD, how the strategies learned from the web-based PD were implemented in instruction for students with ADHD, and trends in teacher participants' level of knowledge before and after participating in the web-based PD.

## **Research Question 1**

This research question was designed to examine the perception of teachers concerning the learning from the web-based PD training on ADHD. Data from the semi-structured interviews, the web-based PD modules open-ended tasks responses and the web-based PD survey were used to answer this question. All teachers felt the web-based PD on ADHD enhanced their understanding of ADHD in addition to acquiring instructional and behavioral strategies for working with students diagnosed with ADHD. In general, more than half of the participants strongly agreed the web-based PD was sufficient to allow learning and collaboration with other participants as measured by the online web-based PD survey.

More than half of the participants noted in the PD survey open-ended questions the most significant learning from the web-based PD was understanding how the brain works from a person with ADHD. Additionally, in the web-based PD open-ended task of Module 2, participants were very detailed in explaining what they learned most about ADHD and the brain. Four of the participants perceived that the presentation of the research-based instructional and behavioral strategies was the most useful part of the web-based PD, while two participants felt the most useful part of the web-based PD were the informational videos on ADHD, such as the TED-talk and animation of the adolescent mind with ADHD.

Participants shared a positive shift in mindset after participating in the content modules of the web-based PD. This shift in mindset awakened a positive approach to tackling the challenges with students that occur due to ADHD and the ability to empathize with the mind of a student with ADHD. One participant commented on one of the PD survey's open-ended questions, "I think the web-based training shifted my perspective completely. Then, I shifted to what can I do with them, given the nature of the disability, so I think that was the biggest change."

Additionally, the TED talk presentation on ADHD provided a personal account that enhanced teacher participants' understanding of ADHD. In the interview, Joan's experience during the web-based PD allowed her to see her students with ADHD in a different way, a holistic manner, as she stated, "I thought it was valuable because it gave you different ways to look at ADHD as a whole. You can see the value in the person and not the part that seems destructive or disruptive."

During the interviews, each participant expressed how frustrated they were with the disruptive behavior exhibited by students with ADHD and their lack of effort or motivation to begin or complete assigned tasks. It was a daily struggle for teachers and students because the teachers were not equipped with instructional or behavioral practices targeted for working with students that have ADHD. After participating in the web-based PD training, teachers conveyed that they felt a little more equipped in how to work with their students that have ADHD. The research-based strategies presented in the web-based PD were also viewed by teacher participants as beneficial in improving attentiveness to instruction and on-task behavior for students that may exhibit similar learning and behavioral characteristics of ADHD.

In all, the data from the PD survey open-ended responses, interviews, and the web-based PD modules open-ended task responses indicated teachers felt the web-based PD was valuable in gaining knowledge about ADHD. Most importantly, all participants perceived to learn something new pertaining to ADHD, such as how one with ADHD thinks and processes information. This new information will aid teachers in becoming more proactive to meet the instructional and behavioral needs of students with ADHD. As a result, students diagnosed with ADHD can improve their academic and behavioral performance in the school setting.

## **Research Question 2**

Research Question 2 was designed to examine how teachers used the research-based strategies learned from the web-based PD in instruction. Semi-structured interviews were used to examine research Question 2. After participating in the web-based PD on ADHD, teacher participants implemented various strategies presented in the web-based PD with students in their class that have ADHD. The most used research-based instructional strategies indicated by teacher participants were peer tutoring, educational technology, computer-assisted instruction, and teacher think-aloud. The most used behavioral strategies indicated were the daily report card (DRC) and self-monitoring. Teacher participants reported using the varied instructional strategies daily and mostly in the content of reading, language arts, and social studies. Teacher participants provided thorough details of how the research-based instructional and behavioral strategies were implemented with students they selected and currently teach who are diagnosed with ADHD.

## **Instructional Strategies**

Module 4 of the web-based PD asked participants to share instructional strategies they currently use with students diagnosed with ADHD prior to learning of research-based strategies from the web-based PD. Teacher participants shared chunking or shortening the assignment as an instructional practice for students with ADHD that struggle with beginning or completing a task. In addition, teacher participants shared when ADHD students were given multiple breaks or brain breaks during the learning tasks, it allowed for movement and release of energy with hopes to collect themselves to complete an assigned task. Other instructional practices shared by teacher participants were frequent reminders to stay on task, frequent rewards, limiting distractions, slowing down the instruction to provide time for the student to process the

information, peer mentor, and having the student to repeat the instructions of an assignment to make sure they are clear about the assignment directions and expectations.

For this single case study, *peer tutor* was reported as being used daily during the instructional day by five participants. Each teacher expressed the peer tutor selected was intentionally chosen to tutor a student with ADHD. The peer tutors were described as being academically on grade level or academically higher than expected grade level. Also, the peer tutor was able to articulate and explain the assignment directions or learning in a simplified way and could remain focused even with distractions from a disruptive student. Further, teacher participants indicated the peer tutor should also be someone the student can trust and has the right personality to assist in the learning tasks and not just give the answers.

Leslie, a fifth-grade teacher participant, reflected how she used a peer tutor during her language arts instructional period by walking through a typical gradual release lesson cycle:

Basically, I would give a whole lesson whole group, a writing assignment, and this is what I am expecting going through the writing process. So, I explain the steps whole group and model it.... Then allow the students to work on their own, but then the ones whom I know have trouble focusing, they don't have to work on their own just yet, so they have a peer tutor to go back over what I have just explained to make sure they understood it.... So, in a less threatening environment when it's just one on one or a smaller group, they'll work with their tutor, and they'll explain it to them. That's the peer tutor model for the class.

Moreover, having a peer tutor was also found to be motivating for students with ADHD. Having one-on-one help provided the student with immediate assistance and increase in motivation to begin and complete a task in a timely manner. For some ADHD students who were assigned a

peer tutor, they were observed as being more expressive and working a little more than usual as long as they were peered with a student that has a “get it done” mentality. For example, during an assignment while working with a peer, one student with ADHD was described as being more participative by exchange in dialogue as they contributed their thinking and predictions about significant events within a literary text.

In addition, teacher participants reported the use of a peer tutor provided teachers more instructional time to work with small groups or other students in need because there was less time being spent redirecting negative behavior or off-task behavior from students with ADHD. Teacher participants found that their students with ADHD liked the idea of working with a peer, considering the behavior they may exhibit at times resulted in working in isolation from their peers. However, teachers did not report if ADHD students were paired with the same peer daily. Also, the use of a peer tutor was found to be ineffective with ADHD students that lacked social skills. In general, peer tutors were used to help keep students with ADHD on-task and less distracted.

*Educational technology* is used as a means for supporting the learning of students with ADHD through *computer-assisted instruction (CAI)*. The use of educational technology was implemented by three teacher participants. The educational technology referenced by the teacher participants was the use of CAI educational apps, online educational learning sites, and learning programs installed on iPads, desktop computers, and Chromebooks. Teacher participants used CAI applications to reinforce reading concepts and skills taught during whole-group instruction at least 2 to 3 times a week. The computer-assisted instruction was mostly reported as being used in the content of reading to improve reading fluency, comprehension, vocabulary development, spelling, and to practice using critical thinking skills. The use of educational

technology stimulated the ADHD student, which resulted in the students remaining more on task, especially if the student was using a program that they were highly interested in and saw themselves having fun while learning.

The CAI commonly used by students with ADHD were *Raz Kids* and *Spelling City*, which embeds game-based study of literacy skills and interactive learning. Students with ADHD were observed being more on-task and less distracted when given the opportunity to partake in the use of educational technology or computer-assisted instruction. In addition, *IXL* and *Educational Galaxy* were two educational technology applications commonly used in the classroom as a strategy to reinforce reading, language arts, and math skills. Teacher participants indicated that the ADHD students who used educational technology or computer-assisted instruction as a means to reinforce the learning taught from the daily lesson, were more on-task, and engaged with minimal to no distractions. Teacher participants did not report the duration of time allotted to ADHD students to engage in learning with educational technology and computer-assisted instruction.

*Teacher think-aloud*, which is a strategy where the teacher models the thinking process by verbalizing his or her thoughts, was reported by three teacher participants as an instructional strategy implemented with ADHD students in their class. All three participants discussed using the teacher think-aloud strategy during whole group instruction. This strategy allowed the student to focus on what is being stated during the lesson and allowed more process and think time. In addition, it provided an example for ADHD students on how the student should be thinking to comprehend the instruction that is being presented.

Moreover, the teacher think-aloud strategy was reported being used in the subject of

writing during whole group instruction to model the brainstorming of ideas and the guided practice of developing ideas. A teacher participant, Joan, expressed the teacher think-aloud strategy, “always seems to get her [ADHD student] to generate more ideas and be on task again and normally able to write without having me to give some consequence for being off task.” Contrary to the success Joan saw using the teacher think-aloud with her student with ADHD, Leslie, a teacher participant, described even after modeling a think-aloud, her ADHD student still needed additional guidance to get started. Although the teacher think-aloud strategy is found effective to help some children think and comprehend meaning from text, one thing to note is that students with ADHD are observed to be tactile learners. Having a tactile learning style may have contributed to the student with ADHD being unfocused even after the teacher modeled how to think through a task (Lasky et al., 2016; Raggi & Chronis 2006). In any case, the individual learning style of a student affects how the student receives and processes information.

### **Behavioral Strategies**

Module 4 of the web-based PD asked participants to share behavioral strategies they currently used with ADHD students before implementing the strategies learned from the web-based PD. Teacher participants shared communicating with the student’s parents about student behavior and failing grades. In addition, smiley charts were used to promote positive behavior and assignment completion. The participants did not report that there was a significant improvement in the student’s behavior or their work efforts with behavioral interventions used prior to participating in the web-based PD. However, participants still voiced a need for wanting more research-based strategies that have proven to be effective in the classroom.

For this single case study, findings revealed that a *daily report card (DRC)* was implemented by three teacher participants as a means to curve negative behavior exhibited in the



classroom, student accountability for their behavior, and communication with parents.

Participants stated the DRC provided a visual representation of how the student's behavior infractions increased or decreased throughout the week and allowed them to be more accountable and aware of their actions to make a change for the better. Moreover, participants found their students with ADHD to be more motivated or display an increased confidence with the implementation of the DRC. The integration of praise and tangible rewards for demonstrating appropriate classroom behavior and effort or completion of assignment tasks also heightened the motivation and confidence of some students with ADHD.

One teacher participant, Leslie, discussed in detail how she implemented the DRC with ADHD students who had behavioral challenges and being off-task. The DRC Leslie used consisted of 30-minute interval columns to record the behavior exhibited every 30 minutes and pre-filled with various behaviors (more attentive in class, completed work in class, and organization, etc.) that are commonly exhibited from students with ADHD. Based on the behaviors noted on the DRC, one or two behavioral categories were selected as a focus for the week with reinforcement the teacher and parent. Students were to take the DRC home to be reviewed and signed by the parent.

The DRC was not only used to record negative behaviors, but as a means to help the student improve those negative behaviors. The targeted behaviors are monitored throughout the week and ranked on a scale of 1 to 4, with 1 being not on task and 4 being on-task. Then, the teacher meets with the student to discuss the DRC. The DRC was found effective for some students that have positive parental support and consistent communication with the teacher. Students that lacked parental support in home-to-school communication were reported having little change or no change at all in negative conduct and off-task behavior with the DRC.

*Self-monitoring* was reported as being implemented by three participants. The self-monitoring was used with ADHD students in second, fourth, and fifth grade. A self-monitoring smiley chart was implemented with a second-grade student with ADHD. The self-monitoring chart and used daily by meeting with the student each morning to review the week's targeted behavior goals. The teacher met with the student during the day to have the student self-reflect on their behavior. The student was given autonomy to honestly choose the behavior they exhibited, and at the end of the day the points were totaled. Points were given based on the smiley face markings on the chart. The point system described consisted of three different face gestures: a smiley face = 10 points, straight face = 5 points, and a frown face = 0 points. If the student reached their goal at the end of the week, the student was rewarded with free time of their choice, and the chart was sent home at the end of each week to be shared with the parent.

Self-monitoring for students with ADHD in fourth and fifth grade was described more as being implemented during the time of working with a peer, group assignment, or during independent work time. The student was expected to self-monitor their behavior while staying on-task with a peer or while working at a computer station independently while the teacher was providing small group instruction to other students. In order to self-monitor, the student must be aware that the behavior they are exhibiting is distracting or unacceptable of the teacher's expectations. Some students with ADHD can struggle with this type of behavioral intervention because of how the brain works in children with ADHD, which makes it a challenge to stay silent, still, and control impulsive behavior. This could be a symptom of impulsivity, acting spontaneously without a conscious of consequences before acting on the impulse. Fourth through fifth-grade teachers found the need to prompt students to stay on tasks, redirect misbehavior, or provide a consequence for off-task behavior decreased in few instances.

### Research Question 3

This research question examined trends that were noticed in teacher participants' knowledge in ADHD as indicated in the KADDS survey before and after the web-based PD training. Teacher participants completed the pre-KADDS survey before beginning the content modules presented in the web-based PD. After completing the content modules, a post-KADDS survey was given to teacher participants to identify trends in the participants' knowledge of ADHD. Overall, participants correctly responded to more than half of the questions on the pre- and post-KADDS surveys. Although there was only a three percent increase in correct responses answered on the post-KADDS survey, this data was quite satisfying considering the teacher participants did not have any training on ADHD prior to the school year, yet still had some general knowledge of ADHD. Data from the pre-KADDS survey concluded that teacher participants begin the web-based PD with some knowledge about ADHD and had slight gains in overall knowledge of ADHD.

The teachers' daily experiences in the classroom with ADHD students may have contributed to the KADDS subscale, *symptoms and diagnosis*, having the highest percentage of correct responses on the pre- and post KADDS survey. With a 9.2% increase from the pre-KADDS survey in the subscale of symptoms and diagnosis, indicated the teacher participants were well aware of the various characteristics and spectrums of ADHD that can be consistently demonstrated in a structured environment such as a classroom setting. Additionally, some teacher participants discussed in the interview being able to identify ADHD students well before receiving the information of being medically diagnosed with ADHD, especially if they are non-medicated. Even with the teacher participants' prior knowledge of ADHD symptoms and how

ADHD is diagnosed, participants were still able to gain new information about ADHD symptoms and diagnosis from participating in the web-based PD on ADHD.

Ironically, the *treatment* subscale yielded the second highest percentage of correct responses on the pre-KADDS survey but had the lowest percentage of correct responses on the post-KADDS survey. The percentage of correct responses in the treatment subscale decreased 5.6% from pre- to the post-KADDS survey. A common factor found in the treatment subscale questions that had a decrease or lower correct response rate asked about the type of treatments that are commonly provided to children with ADHD, as well as, psychological, psychotherapy, and stimulant medications. The web-based PD provided more information on how ADHD affects the brain and learning, and research-based instructional and behavioral strategies for teaching students with ADHD. The content provided in the web-based PD modules may have contributed to the decrease in knowledge about treatment of ADHD. The treatment of ADHD was not a focus in web-based PD content modules. Information on ADHD treatment was only mentioned during the video presentation of the web-based PD on how ADHD affects the brain and learning. In the video presentation, participants were informed that a stimulant is used to treat ADHD symptoms by increasing the dopamine levels. The pre- and post-KADDS survey also provided more information on the lack of knowledge teachers may have in the varied types of treatment for children with ADHD, other than stimulant medication.

The *general knowledge* subscale that assessed knowledge of general information about the nature, causes and prognosis of ADHD had the lowest percentage of correct responses by teacher participants on the pre-KADDS survey. Data from the post-KADDS survey indicated the web-based PD contributed to a moderate increase in general knowledge of ADHD. Teacher participants were found to have some knowledge about ADHD prior to participating in the web-

based PD. However, participants still lacked knowledge in three areas: the cause of ADHD, how the brain works in regards to processing information, and learning and being able to distinguish facts from myths about ADHD. Overall, there was a moderate gain in knowledge of ADHD demonstrated from the teacher participants.

Teacher participants reported not having any pre-service training related to best instructional practices for teaching students with learning or behavioral disabilities, such as ADHD. Teachers also acknowledged their lack of preparation for and knowledge of teaching students with ADHD. They also voiced struggles to find and learn about effective teaching methods for ADHD students. Teachers need the opportunity to continually grow their instructional capacity to meet the needs of all learners, especially those that have neurological and conduct disorders. Nonetheless, continued pre-service and in-service training in ADHD is needed for all teachers.

### **Discussion of the Results in Relation to the Literature**

This study revealed teacher participants' perceptions of the web-based PD in gaining knowledge of ADHD and how teachers used the research-based strategies in instruction. Teacher participant responses conveyed frustration in the classroom setting as they battle with the loss of instructional time to redirect disruptive behavior that some students with ADHD exhibit. Teachers who lack knowledge of ADHD and instructional practices for students with ADHD are more prone to becoming stressed with tackling the learning and behavioral challenges of students with ADHD (Bradshaw & Kamal, 2013). However, after participating in the web-based PD and implementing various strategies learned from the web-based PD with ADHD students, teacher participants reported observing progress in on-task behavior, attentiveness, and

confidence. Additionally, some of their students with ADHD progress were dependent on the kind of day they were having, or the mood of the teacher at that particular moment.

Experiencing the disruptive behaviors of students with ADHD can become a battle between teacher and student because the instruction is halted due to the most common symptoms seen in a classroom setting, hyperactivity, and impulsivity. The teacher consistently has to redirect the student or discipline approaches that only last for spurts of time before the behavior is repeated. Disruptive behavior from children with ADHD can lead to developing negative relationships with their teachers and are likely show an increase in aggressive behavior patterns (Sutherland, Lewis-Palmer, Stichter, & Morgan, 2008). Furthermore, research has shown that teacher attrition is influenced by lack of competency in providing effective instruction and classroom management, which negatively affects student achievement (Sutherland et al., 2005). Without the proper training of how to engage student learners with ADHD and address chronic disruptive behaviors, teacher burnout will occur as the number of students diagnosed with ADHD is on the rise.

Additionally, studies have shown that providing in-service training related to ADHD instructional and behavioral strategies positively shifted teacher self-efficacy in their ability to implement effective teaching practices when teaching students with ADHD (Hepperlen et al., 2002; Jones & Tuscano, 2008; Ohan et al., 2008; Youssef et al., 2015). This single case study found this to be true with participants of the web-based PD on ADHD. Teacher participants felt more equipped in how to provide instruction to students with ADHD that accommodates their executive functions (EF) and cognitive process weaknesses. Teacher participants were receptive to the information presented in the web-based PD and anticipated the implementation of the research-based strategies with their students who have ADHD, hoping that there will be some

kind of change to their classroom setting making it conducive for all student learners and uninterrupted instruction. Researchers also have found that teachers are more participative and actively involved in web-based PD training when technology is integrated, content is purposeful and relative to their daily classroom practices, and has an impact on best practices of how children learn (Barnett, Corkum, & Elik, 2012; Birman, Desimone, Porter, & Garet, 2000; Bos et al., 1997; Diana, 2013). Additionally, Mezirow (1985) posited PD training that entails components of self-reflection, generates a process of stimulus learning, content knowledge, and classroom practice. For this single case study, the web-based PD format enabled teacher participants to be interactive with learning by the use of informative short videos that explained the science of ADHD and how ADHD affects the brain.

Further, providing a TED talk video presentation of an adult's personal account of being a child in a public school diagnosed with ADHD, contributed to the teacher participants' shift in the mindset of how children with ADHD are perceived from a teacher's perspective. This component of the web-based PD was an "aha" moment for most teacher participants as they reflected on how they perceived students with ADHD prior to learning about the science behind ADHD and how the working memory is an EF deficit in children with ADHD. As a result, teacher participants expressed becoming more aware and knowledgeable of children with ADHD cognitive differences. Teachers are now able to utilize the tools learned in the web-based PD to approach their learning and behavior challenges in an effective manner for the student and the teacher.

Moreover, the web-based PD provided the invitation of shared understandings, experiences, and learning. Researchers found the approach of shared understandings led teachers to be empowered to tackle the instructional and learning challenges they are faced with daily in

the classroom (Waheed et al., 2011). Within this web-based PD, each of the four modules embedded tasks were teacher participants responded to open-ended questions that shared their thinking, wonderings, beliefs, and experiences relative to knowledge of ADHD and strategies used with students with ADHD. The web-based format provided teacher participants the opportunity to collaborate with one another by posing questions, responding to one's question, or extending on a participant's response during the participation of the PD. Teacher participation was asynchronous due to the option of participating in the web-based PD at school after the instructional day or at home.

In general, teacher participants found the varied research-based instructional and behavioral strategies for teaching students with ADHD beneficial. Staying on-task and being less disruptive during the educational setting was an improvement for some students with ADHD on a case by case basis. Most teacher participants reported using a select strategy daily, but the duration of the strategy being implemented was not reported. A longer duration or shorter duration of the strategy being used may have improved a student with ADHD ability to be more attentive to a learning task or do the complete opposite. The effectiveness of the strategy was dependent on the severity of the behaviors exhibited, consistency of strategy implementation, and teacher interaction with the student.

In addition, assigning students with ADHD a peer tutor was a common strategy used by teacher participants. Multiple studies found that peer tutoring had a significant positive influence on students with behavioral disorders academic achievements and social skills (Franca, Kerr, Reitz, & Lambert, 1990). Further, studies have proved that with the help of a peer tutor, a student with ADHD had a decrease in disruptive behavior and an increase in engaged learning and academic success (Brock, Grove, & Searls, 2010). Teacher participants who used this



strategy observed improvement in staying on-task and less disruptive behaviors exhibited by students with ADHD. However, teacher participants conveyed the peer tutor was strategically selected based on the personality and level of symptoms exhibited by the student with ADHD. For example, if the student with ADHD was predominately hyperactive-impulsive, the peer tutor selected was calmer, less talkative, but able to assist academically. Teacher participants also conveyed observing students with ADHD to be more motivated and engaged during the learning task when working with a peer.

Integrating technology and computer-assisted instruction was also found to be effective for most students with ADHD. Research has shown educational technology and computer-assisted instruction as a high stimulation, and reduces off-task behaviors, especially for students with ADHD. (Barkley & Knouse, 2010; Dupaul, Weyandt, & Janusis, 2011; Rabiner, Murray, Skinner, & Malone, 2009; Raggi & Chronis, 2006). For this single case study, teacher participants observed students with ADHD being more engaged in the learning, which minimized disruptive behaviors. The interest level of the student was also a variable in the level of engagement exhibited by the student. Additionally, teacher participants found that when the educational program embedded gaming, the students were more motivated to begin, stay on task, and complete the assignment with a digital animation reward. However, teachers did not report if the use of the instructional strategy of integrating educational technology or computer-assisted instruction improved their academic performance in a subject matter.

A common and most notable instructional strategy used by effective teachers is modeling. Teacher model-think aloud was presented in the web-based PD as an instructional strategy for teaching students with ADHD. Teacher participants that implemented this strategy during writing found it to be effective for their students with ADHD and without ADHD.

Researchers have emphasized the importance of teachers modeling thinking-aloud for students, especially students with ADHD who struggle with EFs in problem-solving or critical thinking (Barkley, 1995; Cornoldi et al., Zocchi, 1999; Farr, 2004; Marzano et al., 1988; Seidman et al., 2001). In modeling the learning task, effective teachers went beyond showing the student how to do a task, but also verbalize how to think through the task and generate meaning from the text or concept. This strategy helped students to visualize and verbalize their thoughts to build a clear understanding. Furthermore, teachers indicated modeling how to think aloud helped students hear how to organize information retrieved from memory, which is also a type of EFs deficit for students with ADHD.

Another common and notable strategy for behavior is the DRC, which is frequently used to provide specific feedback to parents about their child's behavior and academic performance (Dupaul et al., 2011). Teacher participants mostly used the DRC because it provided a home-to-school communication about the student's behavior. Most teacher participants found it effective when the parent communication was consistent and the parent supported the interventions put in place by the teacher. Moreover, teacher participants indicated that when rewards and consequences were put in place at home based on feedback on the DRC, students showed a greater improvement in behavior and academic performance, such as completing assignments in a timely manner and being more on task.

Furthermore, researchers have argued that behavioral strategies, such as self-monitoring that intrinsically motivate the student can be effective in lessening the impulsivity and hyperactivity in students with ADHD (Armstrong, 1999; Daley & Birchwood, 2009; Dupaul et al., 2011; Raggi & Chronis 2006). This strategy was found effective with students who exhibit milder characteristics of ADHD. However, teachers found it hard for students with ADHD who

have a more severe or hyperactive-impulsivity of ADHD, teachers found it hard for the student to self-monitor if he or she could not identify whether or not the behavior exhibited was inappropriate or could not understand how one perceived their actions as disruptive. This was found more with third through fifth-grade students with ADHD. Therefore, the teachers resulted in using the DRC that allowed them to specifically record the disruptive behavior that was executed.

### **Limitations**

This single case study was limited to two elementary campus sites within the same district. The study is further limited by the small sample size that was conducted by purposive sampling and the criteria used to select teacher participants. In addition, the varying levels of implementation of the research-based instructional and behavioral strategies as learned in the web-based PD training for working with students with ADHD was contributed to the amount of teaching experience. Even though the strategies implemented were research-based and found to be effective in multiple studies, every child was a unique case, and the frequency and type of strategy implemented was determined by the needs of the individual students with ADHD. This study can further benefit teachers, schools, districts, and students all over the world that encounter children with behavioral and learning challenges, such as ADHD. By expanding this study to include all teachers, not just teachers of students with ADHD will provide teachers an opportunity to increase pedagogy in ADHD and improve instructional practices for any student with learning disabilities or behavioral conduct disorders.

## **Implication of the Results for Practice, Policy, and Theory**

### **Implication of the Results for Practice**

This single case study was designed to examine a web-based PD initiative for teaching students with ADHD. The results of this study may not be easily transferred to other second through fifth-grade elementary teachers of students with ADHD because the study examined the perception of a small sample of second through fifth-grade teachers at two elementary campuses within the same district. However, the methods and data collection used in this single case study are transferable. Furthermore, this single case study adds to the current literature in a manner that may recommend ideas for implementing a web-based PD for teachers on ADHD.

The web-based PD initiative presented in this single case study laid the foundational knowledge of ADHD and presented research-based instructional and behavioral practices for teaching students with ADHD. However, continued PD on best practices for students with ADHD is needed for all teachers regardless of the years of teaching experience or teacher role. Using a web-based platform made it convenient for all participants to participate in the PD, but participants still did not respond to other participants ideas, thoughts, or questions during the PD. It would have been beneficial to have teacher participants to partake in the web-based PD synchronously to ensure participants engaged in a purposeful web-based collaborative experience. By teacher participants synchronously participating in the web-based PD would have allowed participants be more attentive to other participants' responses, questions, and wonderings, which in turn will motivate participants to continue the online collaboration. In addition, participants indicated that providing an online platform where participants can pose instructional practice questions or reflections during the implementation phase could also build a professional learning community of best practices for teaching students with ADHD.

The use of instructional videos that model some of the strategies presented in the web-based PD was an idea expressed when interviewing a teacher participant. Research shows instructional videos are a beneficial component of professional development when it is: specifically aligned with the PD content, provides a model of the teaching practice, participants can discuss the teaching practice being modeled, and discuss how to incorporate it in their instruction or with the level of students they teach, and refine their teaching practices (Christ, Arya, & Chiu, 2017; DeMonte, 2013; Santagata & Guarino, 2011; Seidel, Blomberg, & Renkl, 2013). A teacher participant expressed that video recording a teacher's instructional delivery and implementation of behavioral interventions that occur during the instructional block should be used as an effort to master instructional practices for teaching students with ADHD. Videos used to model instructional practices are found to provide a reality classroom experience where the student's actions and thinking are visible, and the participant can reflect on the instructional response delivered from the teacher (Santagata & Guarino, 2011).

Furthermore, instructional video modeling can enhance teacher self-reflection with a critical eye to improve instruction, show how disruptive behavior is redirected, and possibly shift the negative attitude that some teachers display toward students with ADHD. However, it is important to note, that some teachers may feel that the student demographics or student academic abilities presented in the instructional video does not mirror the type of students they teach and will reject the teaching practices being presented and modeled. For teachers to be receptive of instructional video modeling, Santagata and Guarino (2011) propose that when using video-based instructional modeling, the teaching methods presented should be shown with the knowledge of what the participant can achieve given the appropriate pedagogy and support.

In addition, a teacher participant expressed the idea of providing an opportunity to observe peer teachers that are effective in teaching students that exhibit the varied spectrums of ADHD. Novice or inexperienced teachers of students with ADHD lacked knowledge of general best instructional practices to improve instruction and desired feedback for delivery of research-based strategies with students that have ADHD. Numerous studies that implemented peer observation as a form of professional development to enhance quality of instruction found the use of teacher peer observation promotes self-reflection, discussion of instructional delivery that increases student engagement and learning, and increased collaboration of instructional ideas and feedback (Finn, Chiappa, Puig, & Hunt, 2011; Kersting, Givvin, Sotelo, & Stigler, 2010; Norbury, 2001; Tsoulou, 2016).

### **Implication of the Results for Policy**

Section 504 of the Vocational Rehabilitation Act of 1973 and the Individuals with Disabilities Education Act (IDEA) are two laws in which students with ADHD can receive academic, behavioral, and social help or accommodations at school to meet the child's unique educational needs. As noted earlier, students with ADHD have EFs deficits that can cause learning difficulties in school (Barkley, 2002, 2005, 2012) and may be found eligible to qualify for 504 services that provide learning and behavioral accommodations while still in a general education classroom setting. However, literature related to teacher knowledge of ADHD shows that teachers lack the understanding of ADHD and how it affects learning, and have limited resources for PD on pedagogy of ADHD and research-based practices for teaching students with ADHD (Barkley, 2016; Bradshaw & Kamal, 2013; DuPaul & White, 2006; Guerra et al., 2017; Martinussen, Tannock, & Chaban, 2011; Sutherland, Denny, & Phillop, 2005; Visser, Holbrook, Danielson, & Bitsko, 2015). Inadequate resources, lack of support, and limited PD for teachers

on ADHD will continue to inhibit teacher effectiveness of differentiating instruction to meet the unique learning styles of students with ADHD (Blotnicky-Gallant, Martin, McGonnell, & Corkum, 2014; Bradshaw & Kamal, 2013).

Thus far, as the percentage of children with ADHD in schools across the nation increases (CDC, 2015, 2017), the implication of policies is needed toward research-based effective PD frameworks that provide specific content on the science of ADHD and how children with ADHD learn. Districts and schools beginning of the year in-service training should be reevaluated and redesigned to embed evidenced-based PD for teachers on specific best practices on how to accommodate student learning difficulties with disorders such as ADHD. Additionally, campus in-service PD should integrate technology-interactive learning and consistent follow-up sessions that include PLCs, collaboration, peer coaching and peer observations. Furthermore, campus administrators should not only facilitate but also be an integral part of development as well as a participant in the in-service PD on ADHD to support teachers in implementing and improving their instruction to provide a successful learning environment for students with ADHD.

### **Implication of the Results for Theory**

Symptoms of ADHD can interrupt the academic learning environment and hinder the social setting in the classroom and home. The symptoms of ADHD can cause a child to struggle in restraining hyperactivity and impulsivity, concentration, and positively socializing with peers. The structured school setting required for children is to sit motionless, quietly, and be attentive to the teacher and instruction without distraction, which is a trigger for children with ADHD. However, some students with ADHD who are treated with stimulant medicine and counseling are found to progress through school and their adolescent years without any major struggles.

The findings of this single case study imply that each case of ADHD is different and there is no “quick fix” or single treatment to prevent or terminate ADHD. The disorder of ADHD is becoming more prevalent in students during the primary years as early as second grade, and their academic performance in reading and math is at a decline. Teachers of students with ADHD are aware of the common symptoms of ADHD in adolescents. However, teachers are unaware of best instructional practices to engage participation in the learning and retain the information that is taught. Additionally, teachers are limited with campus and district resources on knowledge and best practices for teaching students with ADHD. PD is a continuing systematic process that includes constant opportunities and experiences that promote professional growth and development (Villegas-Reimers, 2003). As indicated by all teacher participants of this study during the semi-structured interviews, more PD is needed to prepare teachers for teaching and learning challenges that occur daily with students that exhibit learning deficits and behavioral challenges.

### **Recommendations for Further Research**

The findings in this study contribute to the qualitative research that is related to the lack of teacher knowledge of ADHD and best practices for teaching students with ADHD. A web-based PD training initiative was developed to provide knowledge to teachers about ADHD and access to research-based strategies for working with students diagnosed with ADHD. Although the scope of the study was a small sample from two elementary schools in one district, the findings suggest that a similar approach could be used by other schools to help teachers who work with students diagnosed with ADHD. Based on the findings of this study, there are emerging areas for future research.



The duration of this study was not long enough to observe if the research-based strategies influenced the academic performance of students with ADHD. In this study, the greatest improvement observed after implementing the various research-based strategies presented in the web-based PD was an improvement noted by teacher participants of students staying on task and being less disruptive. Granted, when students are more focused, they can retain information with better comprehension, which can lead to academic achievement. Expanding the current study to a greater length in strategy implementation, such as a six-weeks or nine-weeks grading period would provide teachers time to go through trial-and-error in identifying instructional and behavioral strategies that meet the unique needs of a student with ADHD.

Moreover, an extended duration of the strategy implementation allows the student and teacher adequate time to apply the new learning and to observe if the learning was sustained enough to reflect improvement in academic performance and effectiveness in teaching practices. Additionally, larger sample populations would provide greater in-depth qualitative research by providing observations, interviews, and focus groups to support the research already revealed. Also, researchers could replicate the current study by decreasing the inclusion criteria for teacher participants and open the invitation for all teachers, regardless of their years of teaching experience or having participation in prior PD on ADHD.

Novice teachers and experienced teachers in this study requested more training in how to teach students with cognitive and behavioral challenges such as ADHD. They also noted testing and classroom accommodations are provided to teachers for students who receive 504 or special education services, but teachers are not provided with specific instructional practices to adapt their teaching to meet the needs of their students. Further recommendation for future research is the manner in which teacher preparation programs partner with school districts in providing pre-

service and in-service training for teaching students with cognitive and behavioral learning challenges. In a case study investigation, a researcher could examine the partnership of teacher preparation programs and school districts that provide training on best practices for teaching students with cognitive and learning challenges and the impact it has on teacher effectiveness and academic performance. Additionally, a researcher could examine the frequency of follow-up training on best practices for teaching students with cognitive and learning challenges and the level of support provided to teachers. Each prospective study would provide contributions to the literature on teaching students with cognitive and behavioral challenges such as ADHD.

### **Conclusion**

The focus of this chapter was to present an analysis of the findings for the teachers' perception of the learning from the web-based PD training in ADHD, identify how teachers used the research-based strategies learned in instruction, and identify trends in teacher knowledge of ADHD after the web-based PD. The information presented in the study's web-based PD training was conveyed as valuable in learning about how the brain of a student with ADHD works, thinks, and learns, in addition to sharing research-based strategies to support the learning of a student with ADHD. Findings indicated a positive perception from teachers in obtaining new knowledge about ADHD presented in the web-based PD, in addition to acquiring instructional and behavioral strategies for working with students diagnosed with ADHD. Responses to semi-structured interviews indicated teachers used peer tutoring, educational technology, computer-assisted instruction, teacher think-aloud, DRC, and self-monitoring daily as instructional and behavioral strategies for teaching students with ADHD.

Furthermore, teachers observed the students with ADHD being more on-task, engaged, and an increase in confidence at times. The KADDS surveys indicated that there was a slight

increase in the overall knowledge of ADHD after participating in the web-based PD on ADHD. In addition, results findings in relation to the literature review were also discussed. As the ratio of students with ADHD to a classroom continues to increase all across the nation, teachers still continue to lack effective instructional and behavioral practices for teaching students with ADHD. Limited competency in providing effective instruction and classroom management, negatively impacts student achievement and teacher attrition (Sutherland et al., 2005).

Furthermore, the web-based PD contributed to shared knowledge and teaching experiences with students diagnosed with ADHD. Thus, teachers became invested in approaching the instructional and learning challenges exhibited by students with ADHD in the classroom with research-based instructional and behavioral strategies for working with students that have ADHD (Waheed et al., 2011). The academic gap of ADHD students compared to students without ADHD can begin to narrow as teachers are consistently provided the opportunity to partake in targeted PD relevant to the daily challenges related to teaching students with ADHD. School districts, teacher preparation programs, in addition to behavioral programs should develop and provide purposeful, relevant, and targeted training for teaching students with ADHD. Hopefully, as more teachers express the need for more PD that is relevant to the instructional challenges they face with students that have various conduct and cognitive disorders, such as ADHD, districts and campuses will take the necessary steps to assist and support teachers in improving their teaching capacity and the outcome of students that have various learning and behavioral disabilities.

## References

- ADHD Voices. (2012, October 14). *What's it like to have ADHD?* Retrieved from <https://www.youtube.com/watch?v=HI7Ro1PUJmE>
- ADHD Voices. (2012, October 14). *ADHD and me teachers*. Retrieved from <https://www.youtube.com/watch?v=LkaXauVLPgs>
- Albright, A., Howard-Pitney, B., Roberts, S., & Zecarelli, J. (1998). Tell your story: Guidelines for preparing an evaluation report. Sacramento, CA: California Department of Health Services.
- Allan, G. (2003). A critique of using grounded theory as a research method. *Electronic Journal of Business Research Methods*, 2, 1–10.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.
- Armstrong, T. (1999). *ADD/ADHD alternatives in the classroom*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Atkins, M., Graczyk, P., Frazier, S., & Adil, J. (2003). Toward a new model for promoting urban children's mental health: Accessible, effective, and sustainable school-based mental health service. *School Psychology Review*, 32, 503–513.
- Babinski, L. M., Hartsough, C.S., Lambert, N.M. (1999). Childhood conduct problems, hyperactivity-impulsivity, and inattention as predictors of adult criminal activity. *Journal of Child Psychology and Psychiatry*, 40, 347–355.
- Baker, C., Wuest, J. & Stern, P.N. (1992) Method slurring: The grounded theory/phenomenology example. *Journal of Advanced Nursing*, 17, 1355–1360.

Barkley, R. (n.d.). The statistics of ADHD. ADDitude: Strategies and support for ADHD & LD.

Retrieved from <http://www.additudemag.com/adhd-web/article/623.html>

Barkley, R. (1990). *Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment*. Guilford Press, New York.

Barkley, R. (1995) *Taking charge of ADHD*. New York / London: The Guilford Press.

Barkley, R. (2002). International consensus statement on ADHD. *Clinical Child and Family Psychology Review*, 5, 89–111.

Barkley, R. & Knouse, L. (2010). Research findings. *The ADHD report*, 18, 6–15.

Barkley, R. (2011). *Barkley deficits in executive functioning scale (BDEFS)*. New York, NY: Guilford.

Barkley, R. (2012). The important role of executive functioning and self-regulation in ADHD.

Retrieved from [http://www.russellbarkley.org/factsheets/ADHD\\_EF\\_and\\_SR.pdf](http://www.russellbarkley.org/factsheets/ADHD_EF_and_SR.pdf)

Barkley, R. (2016). Research findings. *The ADHD report*, 24, 9–12.

Barnett, B., Corkum, P., & Elik, N. (2012). A web-based intervention for elementary teachers of students with attention-deficit/hyperactivity disorder (ADHD). *American Psychological Association*, 9, 227–230.

Barry, L., & Messer, L. (2003). A practical application of self-management for students diagnosed with attention-deficit/hyperactivity disorder. *Journal of Positive Behavior Interventions*, 5, 238–248.

Beazley, P. (2004). *Issues in mixing qualitative and quantitative approaches to research*.

Published in Buber, R., Gadner, J., & Richards, L. (eds) (2004). *Applying qualitative methods to marketing management research*. UK: Palgrave Macmillan, 141–156.

- Beach, R. (2012). Can online learning communities foster professional development? *Language Arts*, 89, 256–262.
- Bernadowski, C. (2016). “I can’t evn get why she would make me rite in her class:” Using think-alouds in middle school math for “at-risk” students. *Middle School Journal*, 47, 3–14.
- Biederman, J., Monuteaux, M. C., Doyle, A. E., Seidman, L. J., Wilens, T. E., Ferrero, F., Morgan, C. L., & Faraone, S. V. (2004). Impact of executive function deficits and attention-deficit/hyperactivity disorder (ADHD) on academic outcomes in children. *Journal of Consulting and Clinical Psychology*, 72, 757–766.
- Birman, B., Desimone, L., Porter, A., & Garet, M. (2000). Designing professional development that works. *Educational Leadership*, 57, 28–33.
- Blotnicky-Gallant, P., Martin, C., McGonnell, M., & Corkum, P. (2014). Nova Scotia teachers’ ADHD knowledge, beliefs, and classroom management practices. *Canadian Journal of School Psychology*, 30, 3–21.
- Bos, C., Nahmias, M., & Urban, M. (1997). Implementing interactive professional development in a workshop course on educating students with AD/HD. *Teacher Education and Special Education*, 20, 132–145.
- Bradshaw, L., & Kamal, M. (2013). Teacher knowledge, training and acceptance of students with ADHD in their classrooms: Qatar case study. *Near and Middle Eastern Journal of Research in Education*, 5, 1–11.
- Brewer, J., & Hunter, A. (1989). *Multimethod research: A synthesis of styles*. Newbury Park, NJ: Sage.
- Brock, S. E., Grove, V., & Searls, M. (2010). ADHD: Classroom interventions. In A. S. Canter, L. Z. Paige, & S. Shaw (Eds.), *Helping children at home and school III: Handouts for*

- families and educators* (S8H5-1–S8H5-5). Bethesda, MD: National Association of School Psychologists.
- Broad, K. & Evans, M. (2006). *A review of literature on professional development content and delivery modes for experienced teachers*. Technical Report. Toronto, ON: Ontario Ministry of Education.
- Bryk, A.S., & Schneider, B. (2002). *Trust in schools: A core resources for improvement*. New York, NY: Russell Sage Foundation.
- Butler, D., & Schnellert, L. (2012). Collaborative inquiry in teacher professional development. *Teaching and Teacher Education: An International Journal of Research*, 28, 1206–1220.
- Cakir, O., & Horzum, M. (2014). Adaptation motivation toward web-based professional development scale and examining pre-service teachers motivation toward web-based professional development perception in terms of different variables. *Procedia-Social and Behavioral Science*, 131, 144–148.
- Centers for Disease Control and Prevention (CDC). (2017). Attention-Deficit / Hyperactivity Disorder (ADHD). Retrieved from <https://www.cdc.gov/ncbddd/adhd/data.html>
- CHADD (n.d.). National Resource Center on ADHD. Retrieved from <http://www.chadd.org/Understanding-ADHD/About-ADHD.aspx>
- Chan, L., Cole, P., & Morris, J. (1990). Effects of instruction in the use of a visual-imagery strategy on the reading-comprehension competence of disabled and average readers. *Learning Disability Quarterly*, 13, 2–11.
- Chen, C. (2011). Transforming online professional development: The design and implementation of the project-based learning management system (PBLMs) for in-service teachers. *British Journal of Educational Technology*, 42, E5–E8.

- Christ, T., Arya, P., Chiu, M. (2017). Video use in teacher education: An international survey of practices. *Teaching and Teacher Education*, 63, 22–35.
- Clarfield, J. & Stoner, G. (2005). The effects of computerized reading instruction on the academic performance of students identified with ADHD. *School Psychology Review*, 34, 246–254.
- Clearly, S. (2015). New report finds 43 percent increase in ADHD diagnosis for U.S. school children. George Washington University Milken Institute of School of Public Health. Retrieved from <https://publichealth.gwu.edu/content/new-report-finds-43-percent-increase-adhd-diagnosis-us-schoolchildren-0>
- Corbin, J. M., & Strauss, A. L. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*: Sage Publications.
- Cornoldi, C., Barbieri, A., Gaiani, C., Zocchi, S. (1999). Strategic memory deficits in attention deficit disorder with hyperactivity participants: The role of executive processes. *Developmental Neuropsychology*, 15, 153–171.
- Creswell, J. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2<sup>nd</sup> ed). International Educational and Professional Publisher.
- Creswell, J. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3<sup>rd</sup> ed.) Thousand Oaks, CA: Sage Publications.
- Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social Science Information*, 45(4), 18.
- Cullinan, D., & Sabornie, E. (2004). Characteristics of emotional disturbance in middle and high school students. *Journal of Emotional and Behavioral Disorders*, 12, 157–167.
- Cuthell, J. (2008). The role of a web-based community in teacher professional development.



- International Journal Web Based Communities*, 4, 115–139.
- Daley, D., & Birchwood, J. (2009). ADHD and academic performance: why does ADHD impact on academic performance and what can be done to support ADHD children in the classroom? *Child: Care, Health, and Development*, 36, 455–464.
- Demonte, J. (2013). High –quality professional development for teachers: Supporting teacher training to improve student learning. *Center for American Progress*.
- Denzin, N. K. (1978). *Sociological methods: A sourcebook*. New York, NY: McGraw-Hill.
- Desimone, L. M. (2009). Improving impact studies of teachers’ professional development: Toward better conceptualizations and measures. *Educational Researcher*, 38, 181–199.
- Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, 333, 959–964.
- Diana, T. Jr. (2013). Microteaching revisited: Using technology to enhance the professional development of pre-service teachers. *The Clearing House: A Journal of Education Strategies, Issues, and Ideas*, 86, 150–154.
- DiCroce, M., Preyde, M., Flaherty, S., Waverly, K., Karki-Niejadlik, N., & Kuczynski, L. (2016). Therapeutic engagement of adolescents with emotional and behavioral disorders. *Child and Adolescent Social Work Journal*, 33, 259–271.
- Dingle, M., Brownell, M., Leko, M., Boardman, G., & Haager, D. (2011). Developing effective special education reading teachers: The influence of professional development, context and individual qualities. *Learning Disability Quarterly*, 34, 87–103.
- Douglas, A., Carter, A., Smith, F., Killins, S. (2015). Training together: State policy and collective participation in early educator professional development. *New England Journal of Public Policy*, 27, 1–13.

- DuPaul, G. J., & Henningson, P. N. (1993). Peer tutoring effects on the classroom performance of children with attention deficit hyperactivity disorder. *School Psychology Review*, 22, 134–43.
- DuPaul, G. J., Ervin, R. A., Hook, C. L., & McGoey, K. E. (1998). Peer tutoring for children with attention deficit hyperactivity disorder: Effects on classroom behavior and academic performance. *Journal of Applied Behavior Analysis*, 31, 579–592.
- DuPaul, G. J., & Stoner, G. (2003). *ADHD in the schools*. New York: Guilford.
- DuPaul, G. J., Volpe, R. J., Jitendra, A. K., Lutz, J. G., Lorah, K. S., & Gruber, R. (2004). Elementary school students with AD/HD: Predictors of academic achievement. *Journal of School Psychology*, 42, 285–301.
- DuPaul, G. & White, G. (2006). ADHD: Behavioral, educational, and medication interventions. *Education Digest: Essential Readings Condensed for Quick Review*, 71, 57–60.
- DuPaul, G., Weyandt, L., & Janusis, G. (2011). ADHD in the classroom: Effective intervention strategies. *Theory into Practice*, 50, 35–42.
- Every Student Succeeds Act (ESSA) of 2015, Pub. L. No. 114-95 § 114 Stat. 1177 (2015).
- Farr, R. (2004). Using think-alouds to improve reading comprehension. Retrieved on March 14, 2004, from <http://www.readingrockets.org/article.php?ID=421>.
- Farrington, D. P. (1991). Childhood aggression and adult violence: Early precursors and later-life outcomes. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression*. Hillsdale, NJ: Lawrence Erlbaum
- Finn, K., Chiappa, V., Puig, A., & Hunt, P. (2011). How to become a better clinical teacher: A collaborative peer observation process. *Medical Teacher*, 33, 151–155.

- Florian, L. and Linklater, H. 2010. Preparing teachers for inclusive education: Using inclusive pedagogy to enhance teaching and learning for all. *Cambridge Journal of Education*, 40, 369–386.
- Fontana, A. & Frey, J. H. (2000). *The interview. From structured questions to negotiated text*. In Y. S. Lincoln & N. K. Denzin (Eds.), *Handbook of qualitative research* (2nd ed.) (pp. 645–672). Thousand Oaks, CA: Sage.
- Franca, V. M., Kerr, M. M., Reitz, A. L., & Lambert, D. (1990). Peer tutoring among behaviorally disordered students: Academic and social benefits to tutor and tutee. *Education and Treatment of Children*, 13, 109–128.
- Froelich, F., Breuer, D., Doepfner, M., & Amonn, F. (2012). Effects of a teacher training programme on symptoms of attention deficit hyperactivity disorder. *International Journal of Education*, 27, 1–12.
- Fry, P. G., & McKinney, L. J. (1997). A qualitative study of preservice teachers' early field experiences in an urban, culturally different school, 32, 184–201.
- Garet, M., Porter, A., Desimone, L., Birman, B., & Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research*, 38, 915–945.
- Garland, A. E., Hough, R. L., McCabe, K. M., Yeh, M., Wood, P. A., & Aarons, G. A. (2001). Prevalence of psychiatric disorders in youths across five sectors of care. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40, 409–418.
- Gascon, G., Johnson, R., & Burd, L. (1986). Central auditory processing and attention deficit disorders. *J Child Neurol*, 1, 27–33.

- Gehrke, R., Cocchiarella, M. (2013). Preservice special and general educators' knowledge of inclusion. *Teacher Education and Special Education, 36*, 204–216.
- Glaser, B. G., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine.
- Glaser, B. (1978) *Theoretical sensitivity: Advances in the methodology of grounded theory*. Mill Valley, CA: Sage.
- Graff, J.C. (2014). Mixed methods research. In H.R. Hall & L.A. Rousell (Eds.), *Evidence-based practice: An integrative approach to research, administration, and practice* (pp. 45–64). Burlington, MA: Jones and Bartlett Learning.
- Greenwood, C. R., Delquadri, J. C., & Carta, J. J. (1997). *Together we can! Classwide peer tutoring to improve basic academic skills*. Longmont, CO: Sopris West.
- Grisso, T. (2008). Adolescent offenders with mental disorders. *Future of Children, 18*, 143–164.
- Grossman, P., Hammerness, K. M., McDonald, M. & Ronfeldt, M. (2008). Constructing coherence: Structural predictors of perceptions of coherence in NYC teacher education programs. *Journal of Teacher Education, 59*, 273–287.
- Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal, 29*, 75–91.
- Guerra, F., Tiwari, A., Das, A., Vela, J., Shama, M. (2017). Examining teachers' understanding of attention deficit hyperactivity disorder. *Journal of Research in Special Education Needs, 17*, 247–256.
- Guskey, T. R (2009). Closing the knowledge gap on effective professional development. *Educational Horizons, 87 (4)*, 224–233.

- Gustafasson, J. (2017). Single case studies vs. multiple case studies: A comparative study.
- Harrison, J., Bunford, N., Evans, S., & Owens, J. (2013). Educational accommodations for students with behavioral challenges: A systematic review of literature. *Review of Educational Research*, 83, 551–597.
- Hawkins, K., Florian, L., & Rouse, M. (2008, September). Achievement and inclusion in schools and classrooms: Participation and pedagogy. Paper presented at British Educational Research Association Conference: Heriot Watt University.
- Hepperlen, T., Clay, D., Henly, G., Barke, C. (2002). Measuring teacher attitudes and expectations toward students with ADHD: Development of the test of knowledge about ADHD (KADD). *Journal of Attention Disorders*, 5, 133–142.
- Herbert, J., Crittenden, K., & Dalrymple, K. (2004). Knowledge of social anxiety disorder relative to attention deficit hyperactivity disorder among educational professionals. *Journal of Clinical Child and Adolescent Psychology*, 33, 366–372.
- Hodgens, J. B., Cole, J., & Boldizar, J. (2000). Peer-based differences among boys with ADHD. *Journal of Clinical Child Psychology*, 29, 443–452.
- Hoza, B., Mrug, S., Gerdes, A. C., Bukowski, W. M., Kraemer, H. S., Wigal, T., & Arnold, L. E. (2005). What aspects of peer relationships are impaired in children with Attention-Deficit/Hyperactivity Disorder? *Journal of Consulting and Clinical Psychology*, 73, 411–423.
- Hoy, A.W. (2000). *Changes in teacher efficacy during the early years of teaching*. Paper presented at the Annual Meeting of American Educational Research Association, New Orleans.

- Hutchinson, S.A. (1993). Qualitative approaches in nursing research. Grounded theory: the method. *National League for Nursing*. 180–212.
- Imeraj, L., Antrop, I., Sonuga-Barke, E., Deboutte, D., Deschepper, E., Bal, S., & Roeyers, H. (2013). The impact of instructional context on classroom on-task behavior: a matched comparison of children with ADHD and non-ADHD classmates. *Journal of School Psychology, 51*, 487–498.
- Individuals with Disability Education Act Amendments of 2004 [IDEA]. (2004). Retrieved from <https://sites.ed.gov/idea/>
- Irby, B. J. (2015). Virtual Mentoring and Coaching. *Mentoring and Tutoring: Partnership in Learning, 23*, 183–186.
- Johnson, J., & Reid, R. (2011). Overcoming executive function deficits with student with ADHD. *Theory into Practice, 50*, 61–67.
- Jones, H. & Chronis-Tuscano. (2008). Efficacy of teacher in-service training for attention-deficit/hyperactivity disorder. *Psychology in the Schools, 45*, 918–929.
- Junod, R., Dupaul, G., Jitendra, A., Volpe, R., & Cleary, K. (2006). Classroom observations of students with and without ADHD: Differences across types of engagement. *Journal of School Psychology, 44*, 87–104.
- Kao, C. & Tsai, C. (2009). Teachers' attitudes toward web-based professional development, with relation to internet self-efficacy and beliefs about web-based learning. *Computers & Education, 53*, 66–73.
- Kao, C., Wu, Y., & Tsai, C. (2011). Elementary school teachers' motivation toward web-based professional development, and the relationship with internet self-efficacy and belief about web-based learning. *Teaching and Teacher Education, 27*, 406–415.

- Kennedy, M. (1999). Form and substance in mathematics and science professional development. *NISE Brief, 3*, 1–7.
- Kersting, N., Givvin, K., Sotelo, F., & Stigler, J. (2010). Teachers' analyses of classroom video predict student learning of mathematics: further explorations of a novel measure of teacher knowledge. *Journal of Teacher Education, 61*, 172–181.
- Kinzie, M., Whitaker, S., Neesen, K., Kelley, M., Matera, M., & Pianta, R. (2006). Innovative web-based professional development for teacher of at-risk preschool children. *Professional Development for Teachers of At-Risk Preschool Children, 9*, 194–204.
- Knafl, K. A., & Breitmayer, B. J. (1989). Triangulation in qualitative research: Issues of conceptual clarity and purpose. In J. M. Morse (Ed.), *Qualitative nursing research: A contemporary dialogue*. Rockville, MD: Sage Publications.
- Kofler, M. J., Rapport, M. D., & Alderson, R. M. (2008). Quantifying ADHD classroom inattentiveness, its moderators, and variability: a meta-analytic review. *Journal of Child Psychology and Psychiatry, 49*, 59–69.
- Kolb, S. (2012). Grounded theory and the constant comparative method: Valid research strategies for educators. *Journal of Emerging Trends in Educational Research and Policy Studies, 3*, 83-86.
- Larson, K., Russ, S.A., Kahn, R. S., & Halfon, N. (2011). Patterns of comorbidity, functioning, and service use for US children with ADHD, 2007. *Pediatrics, 127*, 462–470.
- Lasky, A., Weisner, T., Jensen, P., Hinshaw, S., Hechtman, L., Arnold, L., Murray, D., & Lee, F., Yeung, A., Tracey, D., & Barker, K. (2015). Inclusion of children with special needs in early childhood education: What teacher characteristics matter. *Topics in Early Childhood Special Education, 35*, 79–88.

- Linklater, H. & Florian, L. (2010). Preparing teachers for inclusive education: Using inclusive pedagogy to enhance teaching and learning for all. *Cambridge Journal of Education*, 40, 369–386.
- Locke, W. R., & Fuchs, L. S. (1995). Effects of peer-mediated reading instruction on the on-task behavior and social interaction of children with behavior disorders. *Journal of Emotional and Behavioral Disorders*, 3, 92–99.
- Long, C., & Hollin, C. R. (1995). Single case design: A critique of methodology and analysis of recent trends. *Clinical Psychology and Psychotherapy*, 2, 177–191.
- Mannuzza, S., Klein, R., Abikoff, H., & Moulton III, J. (2004). Significance of childhood conduct problems to later development of conduct disorder among children with ADHD: A prospective follow-up study. *Journal of Abnormal Child Psychology*, 32, 565–573.
- Mannuzza, S., Klein, R., & Moulton III, J. (2008). Lifetime criminality among boys with attention deficit hyperactivity disorder: A prospective follow-up study into adulthood using official arrest records. *Psychiatry Research*, 160, 237–246.
- Martinussen, R., Tannock, R., & Chaban, P. (2011). Teachers' reported use of instructional and behavior management practices for students with behavior problems: Relationship to role and level of training in ADHD. *Child Youth Care Forum*, 40, 193–210.
- Marzano, R. J., Brandt, R. S., Hughes, C. S., Jones, B. F., Presseisen, B. Z., Rankin, S. C., & Suhor, C. (1988). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Mautone, J.A., DuPaul, G. J., & Jitendra, A.K. (2005). The effects of computer-assisted instruction on the mathematics performance and classroom behavior of children with attention-deficit/hyperactivity disorder. *Journal of Attention Disorders*, 8, 301–312.



- Maykut, P., & Morehouse, R. (1994). *Beginning qualitative research, a philosophic and practical guide*. London, UK: The Falmer Press.
- Merriam, S. B. (1988). *Case study research in education: A qualitative approach*. San Francisco, CA: Jossey-Bass.
- Mezirow, J. (1985). *A critical theory of self-directed learning*. In S. Brookfield (Ed.), *Self-directed learning from theory to practice* (pp. 17–30). San Francisco, CA: Jossey-Bass.
- Miller, P. (2004). Opening the door: Teaching students to use visualization to improve comprehension. *Education World*. Retrieved from [http://www.educationworld.com/a\\_curr/profdev/profdev094.shtml](http://www.educationworld.com/a_curr/profdev/profdev094.shtml)
- Morse, J. M. (1991). Strategies for sampling. In J. M. Morse (Ed.), *Qualitative nursing research: A contemporary dialogue* (pp. 127–145). Newbury Park, CA: Sage.
- Murray, D.W., Rabiner, D., Schulte, A., Newitt, K. (2008). Feasibility and integrity of a parent-teacher consultation intervention for ADHD students. *Child Youth Care Forum*, 37, 111–126.
- National Institute of Mental Health (NIMH). (2016). *Attention deficit hyperactivity disorder*. Retrieved from <https://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml>
- National Institute of Child Health and Human Development (NICHD). (2016). *Learning disabilities*. Retrieved from <https://www.nichd.nih.gov/health/topics/learningdisabilities>
- No Child Left Behind (NCLB) Act of 2001, Pub. L. No 107-110. # 115, Stat. 1425 (2001).
- Norbury, L. (2001). Peer observation of teaching: A method for improving teaching quality. *New Review of Academic Librarianship*, 7, 87–99.

- Ogg, J., Fefer, S., Sundman-Wheat, A., McMahan, M., Stewart, T., Chappel, A., & Bateman, L. (2013). School-based assessment of ADHD: Purpose, alignment with best practice guidelines, and training. *Journal of Applied School Psychology, 29*, 305–327.
- Ohan, J., Cormier, N., Hepp, S., Visser, T., & Strain, M. (2008). Does knowledge about attention-deficit/hyperactivity disorder impact teachers' reported behaviors and perceptions? *School Psychology Quarterly, 23*, 436–449.
- Oster, L. (2001). Using the think-aloud for reading instruction. *The Reading Teacher, 55*, 64-69.
- Owens, J., Holdaway, A., Zoromski, A., Evans, S., & Himawan, L. (2012). Incremental benefits of a daily report card intervention over time for youth with disruptive behavior. *Behavior Therapy, 43*. 848–861.
- Oxford, R. L. (1990). Language learning strategies and beyond: A look at strategies in the context of styles. In S.S. Magnan (Ed.), *Shifting the instructional focus to the learner* (pp. 35–55). Middlebury, VT: Northeast Conference on the Teaching of Foreign Languages.
- Partnership for 21st Century Skills. (2007). *Framework for 21st-century learning*. Retrieved from [http://www.21stcenturyskills.org/documents/frameworkflyer\\_072307.pdf](http://www.21stcenturyskills.org/documents/frameworkflyer_072307.pdf)
- Pastor, P., & Reuben, C. (2008). Diagnosed attention deficit hyperactivity disorder and learning disability: United States, 2004–2006. Vital and health statistics. Series 10, Data from the National Health Survey, 1–14.
- Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Sciences Research, 34*, 1189–1208.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.
- Paz, S. (2001). Teaching writing to students with attention deficit disorders and specific language impairment. *The Journal of Educational Research, 95*, 37–47.

- Pirtle, S., & Tobia, E. (2014). Implementing effective professional learning communities. *SEDL Insights*, 2, 1–7.
- Poekert, P. (2012). Examining the impact of collaborative professional development on teacher practice. *Teacher Education Quarterly*, 39, 97–118.
- Prothero, N. (2008). Teacher efficacy: What is it and does it matter. *Principal*, 87, 42–45.
- Rabiner, D. L., Murray, D. W., Skinner, A. T., Malone, P. (2009). A randomized trial of two promising computer-based interventions for students with attention difficulties. *Journal of Abnormal Child Psychology*, 38, 131–142.
- Raggi, V. L., & Chronis, A.M. (2006). Interventions to address the academic impairment of children and adolescents with ADHD. *Clinical Child and Family Psychology*, 9, 85–111.
- Rakap, S., Jones, H., & Emery, A. (2015). Evaluation of a web-based professional development program (Project ACE) for teachers of children with autism spectrum disorders. *Teacher Education and Special Education*, 38, 221–239.
- Rampai, N. & Sopeerak, S. (2011). The development model of knowledge management via web-based learning to enhance pre-service teacher's competency. The Turkish Online *Journal of Educational Technology*, 10, 249–253.
- Re, M., Pedron, M., Cornoldi, C. (2007). Expressive writing difficulties in children described exhibiting ADHD symptoms. *Journal of Learning Disabilities*, 40, 244–255.
- Reid, R., Trout, A., & Schartz, M. (2005). Self-regulation interventions for children with attention-deficit/hyperactivity disorder. *Exceptional Children*. 71, 361–377.
- Riccio, C., & Hynd, G. (1993). Developmental language disorders in children: relationship with learning disabilities and attention deficit hyperactivity disorder. *School Psychology Review*, 22, 696–708.

- Robinson, P. W., Newby, T. J., & Ganzell, S. L. (1981). A token system for a class of underachieving hyperactive children. *Journal of Applied Behavior Analysis, 14*, 307–315.
- Rogers, E. M. (1995). *Diffusion of innovation* (4th ed.). New York, NY: Free Press.
- Rowley, J. (2002). Using case studies in research. *Management Research News, 25*, 16–27.
- Russell, G., Ford, T., Rosenberg, R., Kelly, S. (2014). The association of attention deficit hyperactivity disorder with socioeconomic disadvantage: alternative explanations and evidence. *Journal of Child and Psychiatry, 55*, 436–445.
- Sadoske M. (1998). *Reading Online*. Retrieved from <http://www.readingonline.org/research/Sadoski.html>
- Santagata, R. & Guarino, J. (2011). Using video to teach future teachers to learn from teaching. *ZDM Mathematics Education, 43*, 133–45.
- Saunders, B., & Chambers, S. M. (1996). A review of the literature on attention deficit hyperactivity disorder children: Peer interactions and collaborative learning. *Psychology in the Schools, 33*, 333–340.
- Sciutto, M., Terjesen, M., Bender Frank, A. (2000). Teachers' knowledge and misperceptions of attention deficit/hyperactivity disorder. *Psychology in the Schools, 37*, 115–122.
- Sciutto, M., Nolfi, C., & Bluhm, C. (2004). Effects of child gender and symptom type on referrals for ADHD by elementary school teachers. *Journal of Emotional Behavior Disorder, 12*, 247–253.
- Sciutto, M. J., & Feldhamer, E. (2005). *Test manual for the Knowledge of Attention Deficit Disorders Scale (KADDS)*. Unpublished Test Manual.

- Sciutto, M. J., Terjesen, M.D., Kučerová, A., Michalová, Z., Schmiedeler, S., Antonopoulou, K., Shaker, N. Z., Lee, J., Alkahtani, K., Drake, B., & Rossouw, J. (2016). Cross-national comparisons of teachers' knowledge and misconceptions of ADHD. *International Perspectives in Psychology: Research, Practice, Consultation*, 5, 34–50.
- Seidel, T., Blomberg, G., & Renkl, A. (2013). Instructional strategies for using video in teacher Education. *Teaching and Teacher Education*, 34, 56–65.
- Seidman, L. J., Biederman, J., Monuteaux, M.C., Doyle, A. E., Faraone, S.V., & Sutker, P.B. (2001). Learning disabilities and executive dysfunction in boys with attention-deficit/hyperactivity disorder. *Neuropsychology*, 15, 544–556.
- Shahi, A. & Azhar, S. (2014). Sketching effective faculty professional development framework. *Asian Journal of Business Management*, 6, 118–123.
- Shannon, D., Snyder, P., & McLaughlin, T. (2015). Preschool teachers' insights about web-based self-coaching versus on-site expert coaching. *Professional Development Education*, 41, 290–309.
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22, 63–75.
- Siqueira, C. & Gurge-Giannetti J. (2011). Poor school performance: An updated review. *Rev Assoc Med Bras*, 5, 78–86.
- Supovitz, J.A., and Turner, H.M. (2000). The effects of professional development on science teaching practices and classroom culture. *Journal of Research in Science Teaching*, 37, 963–980.

- Srivastava, M., De Boer, A., & Pijl, S. (2015). Know how to teach me...evaluating the effects of an in-service training program for regular school teachers toward inclusive education, *International Journal of School & Educational Psychology*, 3, 219–230.
- Stake, R. (1995). The art of case study research. Thousand Oaks, CA: Sage.
- Steiner, L. (2004). *Designing effective professional development experiences: What do we know*. Naperville, IL: Learning Point Associates
- Steiner, N., Sheldrick, R., Gotthelf, D., & Perrin, E. (2011). Computer-based attention training in the schools for children with attention deficit/hyperactivity disorder: A preliminary trial. *Clinical Pediatrics*, 50, 615–622.
- Steiner, N., Sheldrick, R., Frenette, E., Rene, K., & Perrin, E. (2014). Classroom behavior of participants with ADHD compared with peers: Influence of teaching format and grade level. *Journal of Applied School Psychology*, 30, 209–222.
- Strine, T. W., Lesesne, C. A., Okoro, C. A., McGuire, L. C., Chapman, D. P., Balluz, L. S., Mokdad, A. H. (2006). Emotional and behavioral difficulties and impairments in everyday functioning among children with a history of attention-deficit hyperactivity disorder. *Preventing Chronic Disease: Public Health Research, Practice and Policy*, 3, 1–10.
- Sutherland, K., Denny K., & Philip, L. (2005). Teacher of students with emotional and behavioral disorders reported professional development needs: Differences between fully licensed and emergency-licensed teachers. *Preventing School Failure*, 49, 41–45.

- Sutherland, K., Lewis-Palmer, T., Stitcher, J., & Morgan, P. (2008). Examining the influence of teacher behavior and classroom context on the behavioral and academic outcomes for students with emotional or behavioral disorders. *Journal of Special Education, 41*, 223–233.
- Tannock, R. (2007). The educational implications of attention deficit hyperactive disorder. *The Literacy and Numeracy Secretariat, 5*, 2–4.
- TED-Ed. (2010, December 23). Michael Jacobs: ADHD and the brain [Video file]. Retrieved from <https://www.youtube.com/watch?v=u82nzTzL7To>
- TEDxCMU. (2013, April 10). Stephen Tonti: ADHD as a difference in cognition, not a disorder [Video file]. Retrieved from [https://www.youtube.com/watch?v=uU6o2\\_UFSEY](https://www.youtube.com/watch?v=uU6o2_UFSEY)
- Tellis, Winston. (1997). Introduction to case study. *The Qualitative Report, 3*, 1–14.
- Thompson, D. (2014). ADHD can hamper school performance as early as 2nd Grade. Retrieved from <https://www.medicinenet.com/script/main/art.asp?articlekey=184254>
- Topkin, B., Roman, N. V., & Mwaba, K. (2015). Attention deficit disorder (ADHD): Primary school teachers' knowledge of symptoms, treatment and managing classroom behavior. *South African Journal of Education, 35*, 1–8.
- Trochim, W. & Donnelly, J. (2006). *Research methods knowledge base* (3rd ed.). Boston, MA: Cengage Learning Publishing.
- Trout, A., Lienemann, T., Reid, R., & Epstein, M. (2007). A review of non-medication interventions to improve the academic performance of children and youth with ADHD. *Remedial and Special Education, 28*, 207–226.
- Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783–805.

- Tsoulou, G. (2016). Attitudes towards conducting peer observation for teacher development purposes within the Greek state school teaching context. *Research Papers in Language Teaching and Learning*, 7, 7–26.
- Tucker, G. (2014). Behavior intervention plans: What you need to know. Retrieved from <https://www.understood.org/en/learning-attention-issues/treatments-approaches/educational-strategies/behavior-intervention-plans-what-you-need-to-know>
- U.S. Department of Education. (2006). *Teaching children with attention deficit hyperactivity disorder: Instructional strategies and practices*. Retrieved from <https://www2.ed.gov/rschstat/research/pubs/adhd/adhd-teaching-2006.pdf>
- U.S. Department of Education. (2007). *29th Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act*, p. 72. Retrieved from <http://www2.ed.gov/about/reports/annual/osep/2007.pdf>
- U.S. Department of Education. (2010). *Free appropriate public education for students with disabilities: Requirements under section 504 of the rehabilitation act of 1973*. Retrieved from <https://www2.ed.gov/about/offices/list/ocr/docs/edlite-FAPE504.html>
- U.S. Department of Health and Human Services, National Institutes of Health, National Institute of Mental Health. (2016). *Attention deficit hyperactivity disorder*. Retrieved from <https://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml>
- Villegas-Reimers, E. (2003). *Teacher professional development: An international review of the literature*. Paris: UNESCO International Institute for Educational Planning.



- Virtue, D., Main, K., & Pendergast, D. (2015). Core features of effective continuing professional development for middle years: A tool for reflection. *Research in Middle Level Education*, 38, 1–18.
- Visser, S., Zablotsky, B., Holbrook, J., Danielson, M., Bitsko, R. (2015). Diagnostic experiences of children with attention-deficit/hyperactivity disorder. *National Health Statistics Report*, 81, 1–8.
- Waheed, H., Salami, A., Ali, D., & Dahlam, A., (2011). Collaborative web-based teacher professional development system: A new direction for teacher professional development in Malaysia. *The Special Issue on Behavioral and Social Science*, 1, 208–216.
- Weisberg, M. (2000). *Computer supported cooperative work (CSCW)*. Retrieved from <http://tltc.nlm.nih.gov/resources/publications/sourcebook/collaborativework.html>
- Whitaker, A., Kinzie, M., Kraft-Sayre, M., Mashburn, A., & Pianta, C. (2007). Use and evaluation of web-based professional development services across participant levels of support. *Early Childhood Education Journal*, 34, 379–386.
- Wiggins, R. A., Follo, E. J. (1999). Development of knowledge, attitudes, and commitment to teach diverse student populations. *Journal of Teacher Education*, 50, 94–105.
- Wiggins, R. A., Follo, E. J., Eberly, M. B. (2007). The impact of a field immersion program on pre-service teachers' attitudes toward teaching in culturally diverse classrooms. *Teaching and Teacher Education*, 23, 653–663.
- Wiley, A. L., Siperstein, G. N., Bountress, K. E., Forness, S. R., Brigham, F. J. (2008). School context and the academic achievement of students with emotional disturbance. *Behavioral Disorder*, 33, 198–210.

- Yin, R. K. (1984). *Case study research: Design and methods*. Beverly Hills, CA: Sage Publications.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Yin, R. K. (2009). *Case study research: Design and method* (4th ed.). Thousand Oaks, CA: Sage.
- Youseff, M., Hutchinson, G., & Youseff, F. (2015). Knowledge and attitudes toward ADHD among teachers: Insights from a Caribbean nation. *Sage Open*, 1–8.
- Zainal, Z. (2007). Case study as a research method. *Jurnal Kemanusiaan*, 9, 1–6.
- Zentall, S. & Javorsky, J. (2007). Professional development for teachers of students with ADHD characteristics of ADHD. *Behavioral Disorders*, 32, 78–93.

## **Appendix A: Web-Based PD Outline**

### **I. Introduction of PD**

1. Have you ever found yourself saying or thinking the exact thoughts?
  - a. As a teacher, when you hear the term ADHD what comes to mind? (Padlet collaboration)
2. Purpose
3. Objectives
4. What are three things you already know about ADHD? (Padlet collaboration)
5. KADDS pre-survey

### **II. Module 1: Background Research on ADHD**

1. What are 3 things you already know about ADHD ? (Google doc collaboration)
2. What do you want to know more about ADHD and teaching students with ADHD? (Google doc collaboration)

### **III. Module 2: What is ADHD all about?**

1. What causes ADHD: How it Affects the Brain and Learning (video)
3. a. What new information have you learned about ADHD and the brain? (Google doc collaboration)
2. What is it like to have ADHD as a child (video)
3. Teacher/Student Interaction with ADHD (video)
  - a. What kind of teacher/student interaction have you encountered when teaching students with ADHD? (Padlet collaboration)
4. Ted-Talk: ADHD as a difference in cognition (video)
  - a. Based on the information from the various research and video presentations, share any thought-provoking or A-ha moments. (Padlet collaboration)

### **IV. Module 3: Research-based Instructional Interventions for Students with ADHD**

1. Share a few instructional strategies you have used with ADHD students or with students that exhibit ADHD characteristics. (Padlet collaboration)
2. Holistic Learning Approach
3. Incidental Learning
4. Computer- Assisted Instruction (CAI)
5. Cognitive Interventions
  - a. Teacher model think-aloud
  - b. Self-talk or self-verbalization
  - c. Visualization
  - d. Verbal feedback

### **V. Module 4: Research-based Behavioral Strategies for Students with ADHD**

1. Building Engagement Interventions
  - a. Hands-on learning
  - b. Student peer-tutor
  - c. Self-monitoring
  - d. Collaborative discipline /problem solving
  - e. Self-regulation
  - f. Home-school connection
  - g. Daily report card (DRC)

2. Did you learn any new behavioral strategies beneficial to implement with your students who are ADHD? If so, which behavioral strategies presented do you think will be beneficial to students I your class that has ADHD is exhibit characteristics of ADHD? (Padlet collaboration)
3. Behavioral Intervention Summary

#### **VI. Closure**

1. Based on the learning provided in the PD, complete the following statement. ADHD is... (Google doc collaboration)
2. KADDS post-survey
3. PD Likert scale survey

## Appendix B: Web-Based PD Online Survey

| The Web-based PD for learning research-based instructional and behavioral strategies for teaching students with ADHD: | To what degree do you agree with the items below<br>(5 Strongly Agree- 1 Strongly Disagree) |           |             |              |                       |     |
|---|---|-----------|-------------|--------------|-----------------------|-----|
|   | Strongly Agree (5)  | Agree (4) | Neutral (3) | Disagree (2) | Strongly Disagree (1) | N/A |
| 1. was of high quality  |   |           |             |              |                       |     |
| 2. was sufficient to allow learning and collaboration with other participants   |   |           |             |              |                       |     |
| 3. was well planned and interactive   |   |           |             |              |                       |     |
| 4. content was purposeful and applicable to my needs as a classroom teacher   |   |           |             |              |                       |     |
| 5. enhanced my understanding of ADHD  |   |           |             |              |                       |     |
| 6. helped me gain new information and skills about teaching students with ADHD  |   |           |             |              |                       |     |
| 7. will assist me in making informed instructional decisions when teaching students with ADHD                         |   |           |             |              |                       |     |
| 8. modules were informative and thought-provoking   |   |           |             |              |                       |     |
| 9. met/exceeded my expectations   |   |           |             |              |                       |     |
| 10. encouraged me to participate in more web-based PD   |   |           |             |              |                       |     |

### Open-Ended Questions

1. What is the most significant thing you learned from the Web-Based Professional Development on Learning Research-Based Instructional and Behavioral Management Strategies for Teaching Students with ADHD?
2. What was the most useful part of this web-based PD?
3. What was the least useful part of this web-based PD?
4. What support will you need to implement what you have learned?

5. If you were not satisfied with any part of the web-based PD, please explain why.
6. Do you feel training for teachers on best practices for students with emotional, behavioral disorders, such as ADHD is needed? Yes or No and explain why.

## Appendix C: Checklist Monitoring Tool

# Instructional and Behavioral Strategy Checklist

From day to day or at the end of each week, place an "X" beside the strategy that was implemented with each student.

|        | Student 1  | Student 2  | Student 3  |
|--------|--|--|--|
| WEEK 1 | <b>Instructional</b><br>___ computer assisted instruction (CAI)<br>___ educational technology<br>___ hands-on activity/learning<br>___ incidental learning<br>___ peer tutor<br>___ teacher model think aloud<br>___ self-talk/self-verbalization<br>___ verbal feedback<br>___ visualization<br><br><b>Notes:</b> | <b>Instructional</b><br>___ computer assisted instruction (CAI)<br>___ educational technology<br>___ hands-on activity/learning<br>___ incidental learning<br>___ peer tutor<br>___ teacher model think aloud<br>___ self-talk/self-verbalization<br>___ verbal feedback<br>___ visualization<br><br><b>Notes:</b> | <b>Instructional</b><br>___ computer assisted instruction (CAI)<br>___ educational technology<br>___ hands-on activity/learning<br>___ incidental learning<br>___ peer tutor<br>___ teacher model think aloud<br>___ self-talk/self-verbalization<br>___ verbal feedback<br>___ visualization<br><br><b>Notes:</b> |
|        | <b>Behavioral</b><br>___ Daily Report Card<br>___ Self-monitor<br>___ self-regulation<br>___ student/teacher discipline approach<br><br><b>Notes:</b>  | <b>Behavioral</b><br>___ Daily Report Card<br>___ Self-monitor<br>___ self-regulation<br>___ student/teacher discipline approach<br><br><b>Notes:</b>  | <b>Behavioral</b><br>___ Daily Report Card<br>___ Self-monitor<br>___ self-regulation<br>___ student/teacher discipline approach<br><br><b>Notes:</b>  |

# Instructional and Behavioral Strategy Checklist

From day to day or at the end of each week, place an "X" beside the strategy that was implemented with each student.

|        |   |   |   |
|--------|---|---|---|
| WEEK 2 | <p><b>Instructional</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> computer assisted instruction (CAI)</li> <li><input type="checkbox"/> educational technology</li> <li><input type="checkbox"/> hands-on activity/learning</li> <li><input type="checkbox"/> incidental learning</li> <li><input type="checkbox"/> peer tutor</li> <li><input type="checkbox"/> teacher model think aloud</li> <li><input type="checkbox"/> self-talk/self-verbalization</li> <li><input type="checkbox"/> verbal feedback</li> <li><input type="checkbox"/> visualization</li> </ul> <p><b>Notes:</b></p> | <p><b>Instructional</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> computer assisted instruction (CAI)</li> <li><input type="checkbox"/> educational technology</li> <li><input type="checkbox"/> hands-on activity/learning</li> <li><input type="checkbox"/> incidental learning</li> <li><input type="checkbox"/> peer tutor</li> <li><input type="checkbox"/> teacher model think aloud</li> <li><input type="checkbox"/> self-talk/self-verbalization</li> <li><input type="checkbox"/> verbal feedback</li> <li><input type="checkbox"/> visualization</li> </ul> <p><b>Notes:</b></p> | <p><b>Instructional</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> computer assisted instruction (CAI)</li> <li><input type="checkbox"/> educational technology</li> <li><input type="checkbox"/> hands-on activity/learning</li> <li><input type="checkbox"/> incidental learning</li> <li><input type="checkbox"/> peer tutor</li> <li><input type="checkbox"/> teacher model think aloud</li> <li><input type="checkbox"/> self-talk/self-verbalization</li> <li><input type="checkbox"/> verbal feedback</li> <li><input type="checkbox"/> visualization</li> </ul> <p><b>Notes:</b></p> |
|        | <p><b>Behavioral</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Daily Report Card</li> <li><input type="checkbox"/> Self-monitor</li> <li><input type="checkbox"/> self-regulation</li> <li><input type="checkbox"/> student/teacher discipline approach</li> </ul> <p><b>Notes:</b></p>   | <p><b>Behavioral</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Daily Report Card</li> <li><input type="checkbox"/> Self-monitor</li> <li><input type="checkbox"/> self-regulation</li> <li><input type="checkbox"/> student/teacher discipline approach</li> </ul> <p><b>Notes:</b></p>   | <p><b>Behavioral</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Daily Report Card</li> <li><input type="checkbox"/> Self-monitor</li> <li><input type="checkbox"/> self-regulation</li> <li><input type="checkbox"/> student/teacher discipline approach</li> </ul> <p><b>Notes:</b></p>   |



## **Appendix D: Case-Study Timeline**

(Fall Semester 2017)

|  |   |
|--|---|
| August 28-<br>September 8,<br>2017     | Invitation via email was disseminated to second through fifth-grade teachers at two elementary campuses within the current district of the researcher. The invite discussed the study and asked for general education teachers to volunteer to participate in the study. Volunteers were asked to sign a consent form. The expectation was to have at least 6 to 10 teacher participants from both elementary campuses.   |
| September 11-<br>September 29,<br>2017 | Participants were provided access to the web-based PD.<br>Teacher participants were given ten school calendar days to complete the web-based PD. All teacher participants completed the web-based PD within this time frame. Upon completion of web-based PD, teacher participants also selected 1 to 3 students in their class with ADHD, whom they felt would benefit from the strategies presented in the web-based PD.                                      |
| September 25-<br>October 27,<br>2017   | Teacher participants implemented the various strategies presented in the web-based PD to the selected number of students with ADHD that would benefit from research-based instructional and behavioral strategies presented in the professional development. Implementation took place for two consistent weeks, which is equal to 10 school calendar days. The implementation timeframe ranged from September 25- October 27 due to individual campus factors. |
| October 13-<br>November 19,<br>2017    | Teacher participant interviews were conducted within 5 to 10 days of completing two weeks of implementing various research-based instructional and behavioral strategies when teaching students with ADHD. All interviews were completed by November 19, 2017.  |
| November 20-<br>December 15,<br>2017   | Data were collected, interviews transcribed, data sources were triangulated, and analyzed using descriptive statistics and constant comparison method for coding of responses.  |
| January 2018-<br>February 2018         | The researcher developed themes from triangulated data, analyzed results, and reported the data findings and shared with both campus study sites' administration.   |

### **Appendix E: Semi-Structured Interview Questions**

1. What strategies presented during the training did you find effective when working with students with ADHD? How often were they implemented?
2. How have you used them in the classroom? Can you give an example?
3. What behavior interventions work the best with ADHD students?
4. What are the academic and behavioral problems you observe in teaching students with ADHD? How do you handle them?
5. How equipped do you feel you are for working with students with ADHD?
6. How can the PD training be modified to meet the needs of teachers who are working with ADHD students?
7. What questions occurred while implementing the various research-based strategies presented in the PD?
8. What types of training would you like to see offered to help you work more effectively with ADHD students?

## Appendix F: KADDS Subscale Percentage of Responses

Table 6

*KADDS: General Knowledge-15 items (n = 6)*

| Question Items   | CA |             | C              | Percentage of Responses |                |
|--|----|-------------|----------------|-------------------------|----------------|
|  |    |             |                | I                       | DK             |
| Q1 Most estimates suggest that ADHD occurs in approximately 15% of school age children.  | F  | Pre<br>Post | 33.33<br>16.67 | 50.00<br>83.33          | 16.67<br>0.00  |
| Q4 ADHD children are typically more compliant with their fathers than with their mothers.  | T  | Pre<br>Post | 33.33<br>33.33 | 16.67<br>33.33          | 50.00<br>33.33 |
| Q6 ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population.  | T  | Pre<br>Post | 33.33<br>83.33 | 33.33<br>16.67          | 33.33<br>0.00  |
| Q13 It is possible for an adult to be diagnosed with ADHD.   | T  | Pre<br>Post | 83.33<br>83.33 | 0.00<br>0.00            | 16.67<br>16.67 |
| Q17 Symptoms of depression are found more frequently in ADHD children than in non-ADHD children.   | T  | Pre<br>Post | 50.00<br>66.67 | 33.33<br>16.67          | 16.67<br>16.67 |
| Q19 Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.   | F  | Pre<br>Post | 50.00<br>66.67 | 16.67<br>0.00           | 33.33<br>33.33 |
| Q22 If an ADHD child is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework. | F  | Pre<br>Post | 66.67<br>66.67 | 0.00<br>33.33           | 33.33<br>0.00  |
| Q24 A diagnosis of ADHD by itself makes a child eligible for placement in special education.   | F  | Pre<br>Post | 83.33<br>66.67 | 16.67<br>33.33          | 0.00<br>0.00   |
| Q27 ADHD children generally experiences more problem in novel situations.  | F  | Pre<br>Post | 0.00<br>100    | 83.33<br>0.00           | 16.67<br>0.00  |

*Note.* F= False, T= True, CA= correct answer, C= Correct Response percentage, I= Incorrect Response percentage, DK= Don't Know percentage, Pre= Pre KADDS results, Post= Post KADDS results

(Continued)

Table 6

*KADDS: General Knowledge-15 items (n = 6)*

| Question Items  | CA | Percentage of Responses |                |                |                |
|---|----|-------------------------|----------------|----------------|----------------|
|   |    |                         | C              | I              | DK             |
| Q28 There are specific physical features which can be identified by medical doctors (e.g. pediatrician) in making a definitive diagnosis of ADHD.   | F  | Pre<br>Post             | 33.33<br>66.67 | 33.33<br>33.33 | 33.33<br>0.00  |
| Q29 In school age children, the prevalence of ADHD in males and females equivalent.   | F  | Pre<br>Post             | 83.33<br>83.33 | 16.67<br>0.00  | 0.00<br>16.67  |
| Q30 In very young children (less than 4 years old), the problem behaviors of ADHD children (e.g., hyperactivity, inattention) are distinctly different from age-appropriate behaviors of non-ADHD children. | F  | Pre<br>Post             | 33.33<br>33.33 | 50.00<br>33.33 | 16.67<br>33.33 |
| Q31 Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.  | T  | Pre<br>Post             | 100<br>66.67   | 0.00<br>33.33  | 0.00<br>33.33  |
| Q32 The majority of ADHD children evidence some degree of poor school performance in the elementary school years.   | T  | Pre<br>Post             | 83.33<br>83.33 | 0.00<br>16.67  | 16.67<br>0.00  |
| Q33 Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.  | T  | Pre<br>Post             | 3.33<br>50.00  | 16.67<br>16.67 | 50.00<br>33.33 |

*Note.* F= False, T= True, CA= correct answer, C= Correct Response percentage, I= Incorrect

Response percentage, DK= Don't Know percentage, Pre= Pre KADDS results, Post= Post

KADDS results

Table 7

*KADDS: Symptoms and Diagnosis-9 items (n = 6)*

| Question Items  | CA |             | C              | Percentage of Responses |                |
|---|----|-------------|----------------|-------------------------|----------------|
|   |    |             |                | I                       | DK             |
| Q3 ADHD children are frequently distracted by extraneous stimuli.   | T  | Pre<br>Post | 83.33<br>83.33 | 16.67<br>16.67          | 0.00<br>0.00   |
| Q5 In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.  | T  | Pre<br>Post | 0.00<br>66.67  | 83.33<br>16.67          | 16.67<br>16.67 |
| Q7 One symptom of ADHD children is that they Have been physically cruel to other people.  | F  | Pre<br>Post | 83.33<br>66.67 | 16.67<br>33.33          | 0.00<br>0.00   |
| Q9 ADHD children often fidget or squirm in their seats.   | T  | Pre<br>Post | 100<br>100     | 0.00<br>0.00            | 0.00<br>0.00   |
| Q11 It is common for ADHD children to have an Inflated sense of self-esteem or grandiosity.   | F  | Pre<br>Post | 50.00<br>66.67 | 33.33<br>16.67          | 16.67<br>16.67 |
| Q14 ADHD children often have a history of stealing or destroying other people's things.   | F  | Pre<br>Post | 50.00<br>50.00 | 33.33<br>16.67          | 16.67<br>33.33 |
| Q16 Current wisdom about ADHD suggests two clusters of symptoms: One of attention and another considering of hyperactivity/impulsivity. | T  | Pre<br>Post | 100<br>100     | 0.00<br>0.00            | 0.00<br>0.00   |
| Q21 In order to be diagnosed with ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school).            | T  | Pre<br>Post | 83.33<br>100   | 16.67<br>0.00           | 0.00<br>0.00   |
| Q26 ADHD children often have difficulties Organizing tasks and activities.  | T  | Pre<br>Post | 100<br>100     | 0.00<br>0.00            | 0.00<br>0.00   |

*Note.* F= False, T= True, CA= correct answer, C= Correct Response percentage, I= Incorrect Response percentage, DK= Don't Know percentage, Pre= Pre KADDS results, Post= Post KADDS results.

Table 8

*KADDS: Treatment-12 items (n = 6)*

| Question Items   | CA | Percentage of Responses |                |                |                |
|--|----|-------------------------|----------------|----------------|----------------|
|  |    |                         | C              | I              | DK             |
| Q2 Current research suggest that ADHD is largely the result of ineffective parenting skills.   | F  | Pre<br>Post             | 100<br>100     | 0.00<br>0.00   | 0.00<br>0.00   |
| Q8 Antidepressant drugs have been effective in reducing symptoms for many ADHD children.   | T  | Pre<br>Post             | 16.67<br>33.33 | 50.00<br>16.67 | 33.33<br>50.00 |
| Q10 Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment.             | T  | Pre<br>Post             | 100<br>100     | 0.00<br>0.00   | 0.00<br>0.00   |
| Q12 When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.                                      | F  | Pre<br>Post             | 83.33<br>66.67 | 0.00<br>16.67  | 16.67<br>16.67 |
| Q15 Side effects of stimulate drugs used for treatment of ADHD may include mild insomnia and appetite reduction.                       | T  | Pre<br>Post             | 100<br>83.33   | 0.00<br>0.00   | 0.00<br>16.67  |
| Q18 Individual psychotherapy is usually sufficient for the treatment of most ADHD children.  | F  | Pre<br>Post             | 66.67<br>50.00 | 0.00<br>33.33  | 33.33<br>16.67 |
| Q20 In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.                     | T  | Pre<br>Post             | 50.00<br>83.33 | 33.33<br>16.67 | 16.67<br>0.00  |
| Q23 Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.                        | F  | Pre<br>Post             | 33.33<br>33.33 | 33.33<br>50.00 | 33.33<br>16.67 |
| Q25 Stimulant drugs are the most common type of drug used to children with ADHD.   | T  | Pre<br>Post             | 66.67<br>16.67 | 0.00<br>50.00  | 33.33<br>33.33 |
| Q34 Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.            | F  | Pre<br>Post             | 16.67<br>0.00  | 33.33<br>83.33 | 50.00<br>16.67 |
| Q35 Electroconvulsive Therapy (i.e., shock treatment) has been found to be an effective treatment for severe cases of ADHD             | F  | Pre<br>Post             | 33.33<br>33.33 | 0.00<br>0.00   | 66.67<br>66.67 |
| Q36 Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD. | F  | Pre<br>Post             | 83.33<br>83.33 | 0.00<br>16.67  | 16.67<br>0.00  |

*Note.* F= False, T= True, CA= correct answer, C= Correct Response percentage, I= Incorrect

Response percentage, DK= Don't Know percentage, Pre= Pre KADDS results, Post= Post

KADDS results

## Appendix G: Web-Based PD Survey Data

Table 9

*Web-Based PD Survey Data of Participants' Responses (n = 6)*

| The Web-based PD for learning research-based instructional and behavioral strategies for teaching students with ADHD: | Strongly Agree | Agree | Neutral | Disagree | Strongly     |
|---|----------------|-------|---------|----------|--------------|
|   | (5)            | (4)   | (3)     | (2)      | Disagree (1) |
| was of high quality   | 83.33          | 16.67 | 0.00    | 0.00     | 0.00         |
| was sufficient to allow learning and collaboration with other participants  | 66.67          | 33.33 | 0.00    | 0.00     | 0.00         |
| was well planned and interactive  | 83.33          | 16.67 | 0.00    | 0.00     | 0.00         |
| content was purposeful and applicable to my needs as a classroom teacher  | 83.33          | 16.67 | 0.00    | 0.00     | 0.00         |
| enhanced my understanding of ADHD   | 100.00         | 0.00  | 0.00    | 0.00     | 0.00         |
| helped me gain new information and skills about teaching students with ADHD   | 100.00         | 0.00  | 0.00    | 0.00     | 0.00         |
| will assist me in making informed instructional decisions when teaching students with ADHD                            | 83.33          | 16.67 | 0.00    | 0.00     | 0.00         |
| modules were informative and thought provoking  | 83.33          | 16.67 | 0.00    | 0.00     | 0.00         |
| met/exceeded my expectations  | 83.33          | 16.67 | 0.00    | 0.00     | 0.00         |
| encouraged me to participate in more web-based PD   | 83.33          | 16.67 | 0.00    | 0.00     | 0.00         |

*Note.* Participants ( $n = 6$ ) percentage of responses on a 5-point Likert scale are presented above.

The numbers show the percentage of participants that strongly disagreed to strongly agree with each of the web-based PD online survey statements.

## Appendix H: Web-Based PD Survey Open-Ended Responses

Table 10

*Web-Based PD Survey Open-ended Task Questions Participant Responses (n = 6)*

| Open-Ended Question   | Participant Responses   |
|---|---|
| What is the most significant thing you learned from the Web-Based Professional Development on Learning Research-Based Instructional and Behavioral Management Strategies for Teaching Students with ADHD? | <p>I learned that ADHD could occur in adults as well.</p> <p>The most significant tool I took away was understanding of what actually happens in an ADHD student's Brain</p> <p>The various strategies that are used to help students with ADHD.</p> <p>For me to be effective in working with ADHD students, I need to actually spend time understanding the student's state of mind.</p> <p>The most significant thing I learned from the Web-based PD was the difference in the brain between children diagnosed with ADHD and those without.</p> <p>ADHD can look and feel different to different people. So just because one student with ADHD acts a certain way, another student with ADHD may act the complete opposite, but that is because this disorder is not a one size fits all. Every student is different and will need different teaching because of that.</p> |
| What was the most useful part of this web-based PD?   | <p>The new strategies that were presented in this web-based PD.</p> <p>The most useful part of the web-based PD are the strategies.</p> <p>The most useful part of the PD was the behavior strategies to implement in my classroom.</p> <p>The videos.</p> <p>Learning from the TED presentation helped me to understand more fully, what it's like for those who struggle with ADHD and that we need to find better ways of helping these students. There needs to be more training and a better understanding from teachers.</p> <p>Learning new instructional strategies to implement with my students in the classroom.</p>   |



|   |  |
|---|--|
| What was the least useful part of this web-based PD?  | <p>I really enjoyed them all.</p> <p>I took something away from all parts.</p> <p>I found it all quite useful.</p> <p>Some of the smaller "cartoon" video clips weren't as helpful, but I did like that they used real student interviews.</p> <p>I don't think there was any.</p>   |
| If you were not satisfied with any part of the web-based PD, please explain why.  | <p>N/A</p> <p>I was satisfied.</p> <p>Satisfied</p> <p>I really felt as though it contained a lot of useful information.</p> <p>N/A</p> <p>N/A</p>   |
| Do you feel training for teachers on best practices for students with emotional, behavioral disorders, such as ADHD is needed? Yes or No and explain why. | <p>Yes, because a lot of us don't really understand what ADHD really means.</p> <p>Yes. There are too many students with this disorder for teachers not have access to more training.</p> <p>Yes, a lot of teachers are not being equipped to work with students with ADHD. Often times they are put out the class and labeled as "bad" when in fact they are not.</p> <p>Yes, I feel that for us to be better teachers, we need to have an in-depth understanding of how to help students with ADHD as well as other behavior disorders.</p> <p>Yes, I don't think all teachers actually understand what it is.</p> <p>Yes! A lot of teachers I think get frustrated but only because they aren't sure what to do to help fix the behavior issues. If teachers are well prepared and have resources and interventions ready to go to, I think it would relieve a lot of daily stress.</p> |

*Note.* Participant ( $n = 6$ ) responses are provided from the web-based professional development survey open-ended questions.

## **Appendix I: Web-Based PD Open-Ended Modules Responses**

### **Module 1**

As an introductory to the web-based PD on teaching students with ADHD, teacher participants were asked: “What comes to mind when I hear ADHD?” Teacher participants stated the following:

Engagement, goal setting and a lot of patience.

Energetic- When I hear ADHD, I think short lessons and many breaks.

I think of difficulty with focus and learning. I also think of many things going through the child's head at once that keep him or her from focusing.

I think, "Be patient." Someone once told me to imagine driving through a severe hailstorm while trying to learn a new concept at the same time. She said this is what having ADHD is like for our students.

I feel frustrated because I can see the potential but; the student cannot concentrate in order to get what they need from the lessons.

When I hear the term ADHD, I think of a student who really struggles with focusing on the task at hand. I think of a student who needs frequent reminders to stay on task because they have so many things going on in their brain at once.

To share what participants may already know about ADHD, the second question asked participants: “What are 3 things you already know about ADHD?” Teacher participants stated:

1. Doctors run a series of test before a diagnosis is given
2. Children who have ADHD have a difficult time controlling impulses, focusing, completing task, etc.
3. Medicine is used to control it after other methods fail

1. Children with ADHD cannot focus
2. Children with ADHD have a hard time sitting still or completing any work.
3. Sometimes medicine help control the ADHD.

1. A doctor must diagnose a child with ADHD
2. ADHD students are typically very bright
3. ADHD is not always manageable with typical consequences
1. ADHD students do not intentionally try to disrupt.
2. ADHD students need short task with breaks.

3. They desire to be attentive.
1. Doctor diagnosis required for schools to give state-mandated accommodations
  2. Need shortened assignments/or 1 on 1 guidance
  3. Impulsivity
1. A doctor must diagnose a child with ADHD
  2. Some (not all) cases can be treated using medication
  3. Students with ADHD cannot control their impulsiveness

After background research on ADHD was provided, the last question in Module 1 asked, “What do you want to know more about in reference to ADHD and teaching students with ADHD?”

Teacher participants shared the following:

What are some intervention strategies that work best with children diagnosed with ADHD? Which are the least effective? Ways to support parents of students with ADHD?

What causes ADHD? Why is ADHD so common in young children? Is there a cure for ADHD, instead of just medicine to calm the kids? What is taking researchers so long to discover the causes of ADHD?

I would like to have some useful strategies for working with these students ... How does the medicine help these students? Are there any alternatives to medication?

Once a student is diagnosed and medicated, why do they still not achieve academic success? Which medicines work best for academic success? Do students with ADHD also need psychotherapy?

I would like to know which strategies have proven the most effective in the classroom.

Are there certain medicines that I should be aware of extreme side effects? What causes ADHD? Is the rate of diagnosis increasing?

I would like to learn proven techniques to help my students with ADHD be successful in the classroom. If parents refuse to take a child with ADHD symptoms to the doctor, what can I do as a teacher to best meet their needs and not get frustrated? Why does it seem like so many of my students should be ADHD?

## **Module 2**

Module 2 presented informational videos on the scientific study of the brain of children with ADHD, cause-effects of ADHD, and the difference in cognition of adolescents with ADHD versus non-ADHD adolescents. After presenting a video on “ADHD and the Brain,” teacher participants were asked: “What new information have you learned about ADHD and the brain?” Teacher participants stated the following:

It is a behavioral disorder first identified in 1902. Causes of ADHD is unknown. Brain structures and chemical factors give some explanation of how children are affected by this disorder.

The causes of ADHD is unknown and that researchers are still looking for answers. I learned that some brain tissues are either smaller or thicker in children with ADHD. ADHD doesn't only occur to children. Adults also can have ADHD.

It is a chemical disorder. These students typically have lower levels of dopamine. Not all cases are the same due to the differences in brain tissue.

Students with ADHD are usually diagnosed by age 7. These students tend to have a smaller and frontal lobe. The frontal lobe is the part of the brain where judgment occurs. These students also have lower dopamine levels.

Children diagnosed with ADHD often have a smaller cortex (the part of the brain that controls thoughts, actions). The nerve tissue in the brain is sometimes smaller or thinner which can affect a child's attention and impulse control. Children with ADHD have lower amounts of dopamine in the brain. Not having enough dopamine could interfere with cognitive processes.

Students with ADHD have a smaller cortex which controls thoughts and actions. There is a chemical difference in students with ADHD. Their brain produces smaller amounts of dopamine, which interferes with focus and attention. The smaller cortex is located in the frontal lobe, which affects impulse, social skills, reason, and judgment.

The next tasks presented two videos that conveyed what it's like to have ADHD and teacher/student interactions with ADHD. Teacher participants were then asked to note, "What kind of teacher/student interactions have you encountered when teaching students who are ADHD? Teacher participants stated the following:

I always try to remind myself not to get frustrated. However, I find it easier said than done. When I am working with a small group and notice a student with ADHD not on task, it is easy to just call them out and get them back to work. However, I notice it doesn't matter how many times I tell them to get back to work it is only a matter of time before they are playing with their pencil or doing something other than their work.

I've had a multitude of interactions with students who are ADHD. There have been times when the student can feel really disappointed in themselves, and I act as the encouragement to try to break them away from that thinking. There are times when I am there to try to calm students down when they get easily angry or frustrated with academics or with peers. There are also times when I get really frustrated with the student. I honestly feel like sometimes the amount of time I spent with them trying to teach them a concept went wasted and could've benefited another learner.

I have had some really trying interactions with students, and more than once lost my patience. I try to always start with a clean slate every day. That being said, I try to learn from those encounters and not take it personally when a student is struggling to sit still and/or follow along. I find that giving these students a job helps a little. If they have a purpose in the lesson/ classroom, they tend to be more willing to put forth the effort. I have also found that discussing with the students, how I can help them encourages them to communicate better with me and help me to be more aware of when they need a break.

My interaction with students with ADHD has been somewhat positive. This is, in part, because I try to give students a redo every day. I purposely try not to hold on to a bad day or remind students repeatedly of this. Once I recognize a student is having attention issues, I give them preferential seating and establish a secret code if they need a break. It is not perfect, but it does help, somewhat.

The toughest interaction I have with a student with ADHD is when it's testing time. No matter where I seat the student, he or she somehow always get distracted. Once the child was sitting across from me, and I was reading the test questions to him or her, he or she

couldn't even answer the test questions even though I read it twice. He or she just stares out of blank. I was very frustrated because I just couldn't the child to answer the questions, even when I was sitting across from him or her.

The last task in Module 2, was to view a Ted Talk: ADHD as a Difference in Cognition, Not a Disorder by Stephen Tonti. Based on the information presented from the research and video modules, teacher participants were asked to share any thought-provoking or “A-ha” moments. Teacher participants commented the following:

My a-ha is that ADHD can feel and look different for different people. It is not a one size fit all disorder.

I discovered a few different things watching the videos and reading the various research. Most students, not just students with ADHD, want to learn about things that they are passionate about. However, students with ADHD will lose focus (not because they aren't intelligent) because they become uninterested. Perhaps our schools could change the curriculum to include more hands-on learning. I have found that my ADHD kids do some of their best work when they are in science because they get to be a part of an experiment and watch or manipulate things to make them change. I want to know more about specific medications and their side-effects. I'm not a huge fan of medication after listening to Stephen Tonti's TED talk and hearing him describe his personal experience with side effects.

My aha moment came last year with a student that many had given up on. Once I was able to reach him, I discovered he was one of my smartest students. The trick was, as the speaker just said to find something he was passionate about. Once I discovered this, I was

able to find activities, which interested him, and once I did, he was extremely successful!

I also agree it is not so much a deficit as it is a difference in how they process and learn.

Students are attention different, as opposed to attention deficit. As teachers, we must learn how to teach students with cognitive differences.

A-ha moment was when I was doing a running record, and the ADHD child was reading higher than his or her peers. The thing that amazed me about children with ADHD is that I really thought that they have no ability to read or write, but I was wrong. I came to a conclusion that children with ADHD actually know how to read and write, it is just that they can't focus on one task.

### **Module 3**

Teacher participants shared a few instructional strategies used with ADHD students or with students who exhibit ADHD characteristics. Teacher participants shared the following:

I give students with ADHD preferential seating, shortened assignments, and frequent reminders to stay on task.

I give students with ADHD multiple breaks, including brain and restroom breaks. I also give them preferential seating, often with ample space for movement. Another strategy that I use is limiting distractions. In this age of anchor charts, it easy to forget that too much stimuli can be distracting for students with ADHD. Finally, I consciously ignore certain behaviors. For example, if a student is chewing on an object that is not harmful, including fingernails, I ignore it. It takes a lot of patience, but if you seek to first understand, you grow in your level of tolerance.



First work, then a break visual. Frequent rewards, shortened assignments, different behavior system that is looked at 3 or 4 times a day together, frequent reminders, sometimes just touching their shoulder as I'm walking around and teaching will bring them out of their daydream mode.

My first strategy that I used in the classroom with children with ADHD is patient. I told myself if I'm not patient with children with ADHD I will be the one who will be frustrated every day. My second strategy that I used is when I'm explaining something to the class; I tend to slow down and will call on my ADHD student to ask him or her to repeat what I just said. I also don't like to ignore my ADHD students. I call on them during class discussion. Even though there's time that they get stuck with an answer, they tend to want to participate more when they have been called one. It always amazes me when they give the correct answer when though I know that they weren't listening.

I try to give my students with ADHD preferential seating when possible. I also allow them to get up periodically if they need to move as well as chunk longer assignments. I try to find content that these students are interested in and always try to be available to help when they get frustrated. I try to stay patient because I know that me being sharp with them only adds to their frustration. Most generally, if I call on them to help their peers, they take more ownership in their work, so I try to create ways for them to be a peer mentor to those who struggle.

The next tasks allowed teacher participants to learn about various research-based instructional interventions for students with ADHD or exhibit characteristics of ADHD, in addition to cognitive intervention strategies and building engagement strategies. Teacher participants were

then asked, “Did you learn any new instructional strategies to implement with students who are ADHD? If so, which instructional strategies presented do you think will be beneficial to students in your class that may have ADHD or exhibit characteristics of ADHD? Explain why.”

Teacher participants stated the following:

Peer tutoring. I have never thought of doing that before. I always make sure that children of ADHD need to be in a corner by themselves so they won't bother other, but I will definitely try to assign my ADHD students with a peer. I'm hoping that it will help them be encouraged by their peers, and maybe focus a little.

I like the concept of using outside stimuli to keep the students engaged instead of ignoring, where students will then be focused on the stimuli instead of the lesson. I think that also offering students more time using technology can help to diversify the learning and keep the ADHD students more focused.

I like the example of the teacher doing a read aloud who decided to incorporate the outside distraction of the fire truck into her book which helped her ADHD student become engaged back in the story rather than disciplining him for not paying attention.

The strategy of using more hands-on manipulatives and incorporating movement. I think getting them to do something instead of having them sit and listen will get them to participate for a longer span of time.

#### **Module 4**

Teacher participants learned about various research-based behavioral intervention strategies for students with ADHD or exhibit characteristics of ADHD. The first task in module 4

asked teacher participants to share a few behavioral intervention strategies used with ADHD students or students who exhibit ADHD characteristics.

Teacher participants stated the following:

I have talked to their parents to let them know what was happening. Also, I do reward them when I see a good behavior or at least when I see them try to participate in the lesson that day. I would praise them in front of their peers so that their peers' perspective of them can change because to their peers, the children with ADHD are the ones who don't listen and those that teachers always call on them when they are not doing their work or following directions, so I try really hard to praise them in front of their peers.

I have had to simply stop fighting the behavior and sit down and talk to students. I ask them what is going on from their perspective and what they are struggling with. I then ask them how I can help them. It never ceases to amaze me how surprised they are when I ask that question and actually listen. I then try to actually try those strategies with those students. There are no two students who struggle in the same way, so it is important to individually help them. Most of the students I have worked with simply need a break, and I allow them to go wash their face or get water. Other times, they need the lesson given in a different way that helps to engage them. It seems that this is a year-by-year struggle, so I have to keep in mind that each child is different and I need to take the time to figure out what works for each student.

I am a very transparent teacher, and like for the parents, students and myself to all be aware of what is going on. I really like to have conversations with students about why they did something and what they could've done better next time. Sometimes the

impulsive behavior is distracting, but I do understand that it is out of their reach, so I do my best to reason and help the students understand right from wrong at that moment.

I have done a simple smiley chart to work with my ADHD students. It's a point-based system where they are assessed three times a day. However, instead of me deciding which face to color in, the student is asked how they feel they performed the goal we set three times that day. Accountability is huge with the students I have had, this seems to really work.

The second task in module 4 presented various research-based behavioral strategies for students with ADHD. Teacher participants were asked, "Did you learn any new behavioral strategies to implement with students who are ADHD? If so, which behavioral strategies presented do you think will be beneficial to students in your class that may have ADHD or exhibit characteristics of ADHD? Explain why."

Teacher participants stated the following:

I learned the daily report card. I like this strategy because it allows communication between parents and teachers. I also like it help us track the students' progress on a daily basis. It also helps boost students with ADHD confidence that they can do better than others expect of them.

The Self-Regulation Strategy is one that I will try. Anything that empowers the student to monitor their own behavior is worth attempting. This could be a life-long skill for a student with ADHD. By evaluating themselves, they are able to see what they are able to accomplish or not and why. It is also an excellent way to see if we need to switch strategies or adapt.

Daily Report Cards (DRC) sounds like something I would like to use or try. Especially for my students who turn in blank work that we have worked on for an entire week. They end up needing so much "think time" that turns into "daydream" time. I think if I could give them a report card each day that may possibly motivate them to do better (especially if I could get parents on board).

I think the concept of a daily report card is good but also think I will work more with these students to self-regulate the behaviors.

I like the Likert scale. A tool for students and teachers to self-regulate their behavior. I also like the DRC's and to try to transfer that from school to home.

For the last task in module 4, teacher participants were asked to complete the following statements based on the learning provided in the PD: (1) ADHD is . . . and (2) The web-based PD on teaching students with ADHD has allowed me as a teacher to . . . The teacher participants' responses are shown in Table 11.

Table 11

*Web-Based PD Module 4 Final Task Responses*

| ADHD is . . .   | The web-based PD on teaching students with ADHD has allowed me as a teacher to . . .   |
|---|--|
| ADHD is not a disease.                                      | Be a better teacher and to not get frustrated with students with ADHD. It also allowed me to accept the uniqueness the students with ADHD bring to my classroom.   |
| ADHD is not a deficit; it's a difference.                   | First, seek to understand and see the humanity and the myriad of possibilities of students with ADHD, During times of frustration, remembering this will assist my student and me.   |
| ADHD is more complicated than simply behavior.              | Trying to understand where the student is coming from is a good first step in helping students to self-regulate  |
| ADHD is a different way of learning.                        | Finding ways to encourage students to focus on things they are interested while teaching the objectives is a first step into fostering growth for students who struggle with ADHD.   |
| ADHD is an obstacle to learning.                            | Better understand the reasoning behind what causes ADHD as well as what I can do as a teacher to better the student's learning experience.   |
| ADHD is an attention difference, not an attention disorder. | Empathize with my students with ADHD. I think this will help me become more patient with my students and I now have some tools to implement that I didn't before. Hopefully, this will decrease mine and the students' frustration in the classroom. |

## Appendix J: Teacher Participant Consent Form

Concordia University – Portland Institutional Review Board  
Approved: will Expire: September 13, 2017; will Expire: July 8, 2018

### CONSENT FORM

**Research Study Title:** A Single Case Study: Web-Based Professional Development on Learning Research-Based Instructional and Behavioral Management Strategies for Teaching Students with ADHD

**Principal Investigator:** Joy Runnels

**Research Institution:** Concordia University-Portland, Oregon

**Faculty Advisor:** Dr. Sally Evans

#### **Purpose and what you will be doing:**

The purpose of this single case study is to explore teacher perceptions of the web-based PD for teachers of ADHD students to see if the knowledge of ADHD and its symptoms gained in the training was beneficial for instruction for students diagnosed with ADHD. We expect approximately four volunteers to participate in the study. No one will be paid to be in the study. We will begin enrollment on September 13, 2017 and end enrollment on September 19, 2017

To be in the study, you will be asked to complete three surveys. One will be given at the start of the web based training and the other two towards the end of the training. Each of the surveys should take no longer than 10 minutes to complete. Some participants will additionally be asked to participate in a 30-40 minute interview to discuss the training and subsequent work with students in the classroom using the strategies learned in the training.

#### **Risks:**

There are no risks to participating in this study other than providing your information. However, we will protect your information. Any personal information you provide will be coded so it cannot be linked to you. Any name or identifying information you give will be kept securely via electronic encryption or locked inside a cabinet. When we or any of our investigators look at the data, none of the data will have your name or identifying information. We will only use a secret code to analyze the data. We will not identify you in any publication or report. Your information will be kept private at all times and then all study documents will be destroyed 3 years after we conclude this study.

#### **Benefits:**

Information you provide will help in identifying effective pedagogies for working with ADHD students. You could benefit this by learning more about ADHD and how it affects students in the classroom.

#### **Confidentiality:**

This information will not be distributed to any other agency and will be kept private and confidential. The only exception to this is if you tell us abuse or neglect that makes us seriously concerned for your immediate health and safety.

**Right to Withdraw:**

Your participation is greatly appreciated, but we acknowledge that the questions we are asking are personal in nature. You are free at any point to choose not to engage with or stop the study. You may skip any questions you do not wish to answer. This study is not required and there is no penalty for not participating. If at any time you experience a negative emotion from answering the questions, we will stop asking you questions.

**Contact Information:**

You will receive a copy of this consent form. If you have questions you can talk to or write the principal investigator. If you want to talk with a participant advocate other than the investigator, you can write or call the director of our institutional review board, Dr. OraLee Branch (email [obranch@cu-portland.edu](mailto:obranch@cu-portland.edu) or call 503-493-6390).

**Your Statement of Consent:**

I have read the above information. I asked questions if I had them, and my questions were answered. I volunteer my consent for this study.

\_\_\_\_\_  
Participant Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Investigator Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Investigator Signature

\_\_\_\_\_  
Date



Investigator: Joy Runnels email: |  
c/o: Professor Sally Evans  
Concordia University – Portland  
2811 NE Holman Street  
Portland, Oregon 97221



## **Appendix K: Statement of Original Work**

The Concordia University Doctorate of Education Program is a collaborative community of scholar-practitioners, who seek to transform society by pursuing ethically-informed, rigorously-researched, inquiry-based projects that benefit professional, institutional, and local educational contexts. Each member of the community affirms throughout their program of study, adherence to the principles and standards outlined in the Concordia University Academic Integrity Policy. This policy states the following:

### **Statement of academic integrity.**

As a member of the Concordia University community, I will neither engage in fraudulent or unauthorized behaviors in the presentation and completion of my work, nor will I provide unauthorized assistance to others.

### **Explanations:**

#### ***What does “fraudulent” mean?***

“Fraudulent” work is any material submitted for evaluation that is falsely or improperly presented as one’s own. This includes, but is not limited to texts, graphics and other multi-media files appropriated from any source, including another individual, that are intentionally presented as all or part of a candidate’s final work without full and complete documentation.

#### ***What is “unauthorized” assistance?***

“Unauthorized assistance” refers to any support candidates solicit in the completion of their work, that has not been either explicitly specified as appropriate by the instructor, or any assistance that is understood in the class context as inappropriate. This can include, but is not limited to:

- Use of unauthorized notes or another’s work during an online test
- Use of unauthorized notes or personal assistance in an online exam setting
- Inappropriate collaboration in preparation and/or completion of a project
- Unauthorized solicitation of professional resources for the completion of the work.

### Statement of Original Work (Continued)

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University-Portland Academic Integrity Policy during the development and writing of this dissertation.
2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*

*Joy Runnels*

---

Digital Signature

Joy Runnels

---

Name (Typed)

April 5, 2018

---

Date