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Enhancing support for elementary school students with attention deficit hyperactivity disorder: exploring the Go PEO application as an occupational therapy digital intervention for teachers

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Doctoral Project

ENHANCING SUPPORT FOR ELEMENTARY SCHOOL STUDENTS

WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER:

EXPLORING THE GO PEO APPLICATION AS AN OCCUPATIONAL

THERAPY DIGITAL INTERVENTION FOR TEACHERS

by

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DEDICATION

I dedicate this work to my parents, Tom Scannell, and Jane Scannell, who have always

loved and supported me.

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ABSTRACT

Neurodivergent elementary school students with attention deficit hyperactivity disorder (ADHD) face extra obstacles on the path to academic and social success in school compared to the average student without ADHD (CDCa, 2022; Rigoni et al., 2020). This problem is rooted in a mismatch between person, environment, and occupation in elementary schools, which can be illustrated by the Person, Environment, and Occupation (PEO) model. A variety of interventions and accommodations have been used to address this problem, including therapies, instructional techniques, and pharmaceutical interventions, among others. Still, the barriers for students with ADHD exist. Additionally, barriers to implementing these interventions and accommodations exist and limit teachers (Gaastra et al., 2020; Lawson et al., 2022; Szép et al., 2021).

Based on a review of the current elementary school climate and supports, a new intervention is proposed and outlined in this doctoral paper. The intervention will be a free online application, Go PEO. Go PEO will be a guided problem-solving tool that uses

the PEO model to plan and implement evidence-based and neurodiversity affirming support for elementary students with ADHD in the school setting. It will be evaluated through a series of surveys, disseminated through local and national education agencies, and funded through grants and awards. It is anticipated that the Go PEO intervention will improve the well-being of students and elementary school educators, including occupational therapy practitioners, by saving them time and energy when planning and implementing support for students with ADHD. Through the eight chapters and 12 appendices of this doctoral paper, all needed elements of consideration will be described, making this intervention ready for collaboration.

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CHAPTER ONE – Introduction

Introduction to Chapter One

This chapter will introduce the problem that will be addressed by Go PEO and set the stage as to why it is important. First, an overview of the problem will be described. Then, the people, environments, and occupations involved in the problem will be defined. Lastly, an overview of the proposed occupational therapy digital intervention to address the problem will be provided.

The Problem

The problem is rooted in a mismatch between person, environment, and occupation in United States of America (USA) elementary schools. The mismatch places extra obstacles on the path to school success for neurodivergent students with attention deficit hyperactivity disorder (ADHD), compared to the average student without ADHD (CDCa, 2022, Rigoni et al., 2020). In school, students with ADHD are more likely to face lower academic performance, higher dropout rates, and more grade retention (Rigoni et al., 2020). By the age of 12, students with ADHD receive 20,000 more negative messages from adults than students without ADHD (Dodson, 2016). What is the mismatch that causes 9.8% of children in the USA [the percentage of the USA population 3–17 years old, who have a diagnosis of ADHD (CDCb, 2022)] these problems? The following section will answer this question with an in-depth review of each person, environment and occupation involved.

The People: Students with Attention Deficit Hyperactivity Disorder (ADHD)

"Neurodiversity describes the idea that people experience and interact

with the world around them in many different ways; there is no one "right"

way of thinking, learning, and behaving, and differences are not viewed as

deficits" (Baumer & Frueh, 2021, para. 1).

ADHD is a form of neurodiversity. ADHD is currently represented in the

diagnostic statistical manual 5 (DSM-5) by The American Psychiatric Association, 2013,

as *"*a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with

functioning or development" (Attention-Deficit/Hyperactivity Disorder Diagnostic

Features) with three presentation types — hyperactive/impulsive, inattentive, or

combined. Since ADHD was first studied, the cause of it has been a topic of debate

(Nigg, 2006). Even recently, a study in Germany found that 20% of the general

population believed ADHD was not a real disease (Speerforch et al., 2021).

Through digital scans, ADHD has been found to be rooted in a structural brain

difference and may be related to variations in genetics (Thapar et al., 2012; Barkley,

2017). The causes of ADHD are complex, and most causes are biological, with some

evidence of social factors exacerbating ADHD (Barkley, 2017). The current diagnostic

procedure is based on observation and subjective judgment, as the means to diagnose

using a neurobiological method does not currently exist to the general public (Grimm et

al., 2020).

ADHD is known to present differently between females and males, with males

making up a larger percentage of the diagnosed cases in the USA (CDC, 2022b). Females

with ADHD are at a higher risk of being overlooked for diagnosis, as their characteristics often vary slightly in presentation and severity compared to their male counterparts (Mowlem et al., 2019).

ADHD is a lifelong diagnosis (CHADD, 2023c). Attending school is beneficial for students with ADHD in decreasing the level of risk associated with ADHD (Nguyen et al., 2019). Strengths commonly associated with ADHD are creativity, imagination, (McDougal et al., 2022) contributing unique innovative ideas, the ability to hyperfocus, positive response to novelty (Climie & Mastoras, 2015; Smith, 2023), spontaneity, energy and enthusiasm, resilience, and determination (Smith, 2023).

The People: Elementary School Teachers

Elementary school teachers help young children develop learning habits and social skills through social and intellectual development through activity-based lessons, and formal lessons (Stoffle, n.d.). Teachers collaborate with students' parents and guardians through progress reports, teacher meetings, and other communication methods. Elementary school teachers also participate in professional development education on a regular basis (Stoffle, n.d.). According to US News and World Report, being an elementary school teacher involves above average levels of stress and a median salary of $61,400 (U.S. News, n.d.).

Teachers have completed training and certification. In the USA, a bachelor's degree is required to teach, and in about 25% of states, an additional content licensure test is required (Mustafa, 2023). These bachelor programs cover theoretical and practical skills of teaching. To prepare teachers to work with parents, caregivers, and students,

topics of child development and psychology are covered. Additional specialty areas that may be pursued as a concentration in a bachelors or masters program include English as a second language (ESL)/bilingual education, gifted and talented education, lower elementary (K–3), special education, science, technology, engineering and math (STEM), subject area (physical education, art, language arts, music, math, etc.), and upper elementary (grade 3–6) (Teacher Certification Degrees, n.d.). Background checks must also be conducted and passed (Mustafa, 2023).

The Environment and Occupation

Teaching in the elementary school setting is reported to be both challenging and rewarding (Lee, 2018; Lee, 2019). Teachers report loving the following parts of teaching: hugs and funny comments from students, and the moment a student demonstrates understanding of a concept (Lee, 2018). Teachers report getting to be life-long learners, experiencing diversity of backgrounds and abilities of students in school, and a sense of satisfaction when positively influencing a student's life and love of learning (Padrón, 2020). Additional favorite aspects of teaching, as reported by teachers, are having a "fresh start" every school year, getting to know students, and laughing as a class (Mulvahill, 2017).

Currently, there is a teacher shortage in the USA (García & Weiss, 2019). Student behavior challenges, limited time, and managing emails make teaching difficult (Lee, 2019). A negative school climate, student absenteeism, student apathy, lack of parental involvement, and student health make teaching challenging, and many teachers report high levels of stress and fears for their safety (García & Weiss, 2019). Standardized tests

are also among the forces that limit teaching (Cunningham, 2018). Based on the author's

five years of working in USA public schools, it is notable that a teachers' days consist of

constant task-shifting — from the school occupational therapy practitioner asking them to

complete a Sensory Processing Measure rating scale on a student, to a student's mom

emailing to say Johnny has a dentist appointment Wednesday afternoon, to a student who

has a scraped knee, the demands are continuous and shifting. In the USA, 44% of

teachers in K–12 said they feel burned out at work very often or always (Bouchrika,

2023).

Many teachers report a lack of training regarding how to support students with

ADHD (Poznanski et al., 2021). Teachers are looking for resources and training on

ADHD to improve the school experience for their students (CHADD, 2023b). Even those

teachers who do not feel limited by a lack of training face barriers to implementation

when supporting students with ADHD including class size, class composition, lack of

time, and unfamiliarity or insufficient knowledge of supports (Gaastra et al., 2020;

Flanigan & Climie, 2018). Considering all these barriers, the problem to be addressed is

the mismatch between the ADHD neurotype and the elementary school set-up that can

lead to stress and burnout for students with ADHD, and their teachers.

Since there are external demands in place in teaching today, current expectations

are set on the students to allow the greatest number of students and teachers to succeed.

These expectations include requiring students to sit still, perform well on tests, and

understand worksheets presented a certain way. Difficulty paying attention, sitting still,

and controlling impulses are all things expected of elementary school students that can

make school challenging for students with ADHD (CDCa, 2022). At least one in five

students with ADHD do not receive specific services at school despite facing significant

barriers to social and academic function (DuPaul et al., 2018).

Proposed Project

While a system level change may be necessary to remove all the barriers faced by

students with ADHD while in elementary school, there are modifications,

accommodations, and skills training that can be made by teachers and school staff at the

classroom and building level to remove some of these barriers (CDC, 2022a; CHADD,

2023a). When implemented with the student's personality, strengths, and needs in mind,

environmental and occupation modifications can significantly improve the elementary

school experience for students with ADHD (CHADD, 2023a). The specifics of these

supports that have been studied and are published in the evidence-based literature, as well

as those which have anecdotally been supported, will be outlined in more depth in

Chapter 3.

This project, which will be further outlined in Chapter 4, is a proposed free

application (app), called Go PEO, which will make implementing student-specific

supports easier by providing direct access to evidence-based and neurodiversity affirming

ADHD supports, data tracking systems, and team action item assignment lists. When a

student is observed to face a challenge in a specific environment or occupation of the

school day, teachers will input information on the student, occupation, and environment,

and will then be provided specific supports and step-by-step instructions for

implementing the supports. This process can take place in 15 minutes or less, and the

online information can be saved and returned to. During app use, teachers will better

understand the neurodevelopmental nature of ADHD and be able to support students with

ADHD without strain or additional frustration. This proposed app will be designed for

use by elementary school educators of students with ADHD, which may include general

education teachers, special education teachers, related service providers,

paraprofessionals, and administrators. Throughout this doctoral project paper, when

referring to the proposed app, the term "teachers" will be used to refer to all of these

educators.

Conclusion

In conclusion, this chapter explained that there is a mismatch between the

neurotype of students with ADHD and the environments and occupations of elementary

school, which makes school challenging for students with ADHD. There are

modifications to the environment and occupations, as well as skills training, that can

decrease the burden of this mismatch. Teachers face barriers to implementing these

supports. A free digital app is being proposed to help decrease the barriers teachers face

when planning and implementing these supports.

CHAPTER TWO – Project Theoretical and Evidence Base

Introduction to Chapter Two

This chapter will describe the theory behind the problem using the Person, Environment, and Occupation (PEO) model. First, the PEO model will be described. Then, the problem described in Chapter 1, the mismatch between the neurotype of students with attention deficit hyperactivity disorder (ADHD) and the elementary school setting, will be described, using the PEO model. A visual representation will be used to illustrate the problem using the context of the PEO model. Written descriptions of each component of the visual model will be provided. Finally, a conclusion will tie all the elements of Chapter 2, the project theoretical and evidence base, together.

The Person, Environment, and Occupation Model

The Person, Environment, and Occupation model, or PEO model, suggests that the person, environment, and occupation interact regularly over time and space, and the better the fit, or compatibility, between the person, environment, and occupation, the greater the occupational performance will be (Law et al., 1996). The person is a human being with many roles (Law et al., 1996). The environment is the combination of physical, social, cultural, institutional, and socio-economic domains where the person completes the occupation (Law et al., 1996). The occupation is the activity that meets a person's needs and desire for purpose (Law et al., 1996).

Application of the Person, Environment, and Occupation Model

In the case of the problem described in chapter one, two related PEO models are to be considered: one with the person being the student, and the other with the person

being the teacher. The student is tasked with the occupation of completing classwork and making friends (among many other school-based occupations), and the teacher is tasked with the occupation of delivering instruction that promotes the student's success (among many other work-based occupations). Both models take place in the school environment, with different environmental characteristics, from class size to visual clutter on the walls, impacting occupational performance. A mismatch is currently present in each of these PEO models, which causes poor student performance and teacher burnout. This relationship is represented in the visual model of the problem in Appendix A and described in greater depth in the following paragraphs.

Student PEO Model

Student Person

The student as a person in the PEO model consists of their interests, such as basketball, roles, such as being a big sister, and their skills, such as drawing (AOTA, 2020). US elementary school students typically range in age from 5 (USA Department of Homeland Security, 2023) to 10 years old (USAHello, 2023). Approximately 46% of students in public schools are white, 28% are Hispanic, 15% are Black, 5% are Asian and 1% are American Indian (National Center for Education Statistics, 2023).

As described in Chapter 1, ADHD is a form of neurodiversity with three presentation types: hyperactive/impulsive, inattentive, or combined (The American Psychiatric Association, 2013). ADHD presents differently between females and males. Females are at a higher risk of being overlooked for diagnosis (Mowlem et al., 2019). Males making up a larger percentage of the diagnosed cases in the USA (CDC, 2022b).

As described in Chapter 1, the strengths commonly associated with and integral to the student with ADHD are creativity, imagination (McDougal et al., 2022), contributing unique innovative ideas, the ability to hyperfocus, positive response to novelty (Climie & Mastoras, 2015; Smith, 2023), spontaneity, energy, enthusiasm, resilience, and determination (Smith, 2023).

Student Environment

The elementary school building set up will vary based on the school the student attends. Characteristics and categories to consider are the size of the student body, the length of time to transport from home to school, and the sections of the school (Piller, 2017). The presence or lack of universally free breakfast is a significant environmental characteristic (Bartfeld et al., 2019).

The physical areas may include main classroom, hallway, cubbies/lockers, cafeteria, playground, music room, gymnasium, art room, computer room, main office, (Barrett et al., 2019). Characteristics of each section to be considered are the amount of auditory, visual, tactile, olfactory, and gustatory input in each environment, and the predictability of those inputs, and predictability of routines, including how rules and regulations are communicated (Piller, 2017).

The culture and connectedness of the school building and classroom are also impactful aspects of the environment (CDC, 2009; Piller, 2017). This includes the disability attitudes in the school environment, held by peers and staff (Steen & Wilson, 2020).

Student Occupation

Elementary school students engage in a variety of occupations in the school setting, at times multiple occupations at once, including but not limited to, morning meetings, recess, reading, math work, and science class (Levesque, 2020). School is both widely social and widely academic and incorporates a large variety of opportunities for meaningful engagement; sometimes these are sporadic opportunities like fire drills, or routine occupations like snack time (Piller, 2017).

As stated in Chapter 1, current classroom performance standards are set and often require students to sit still, perform well on tests, and understand worksheets presented a certain way. Difficulty meeting these performance standards, which require paying attention, sitting still, and controlling impulses, can make school challenging for students with ADHD (CDCa, 2022). Thus, support for students with ADHD is implemented. However, at least one in five students with ADHD do not receive specific services at school (DuPaul et al., 2018).

Teacher PEO Model

Teacher Person

Like students, the teacher's person includes their interests, like singing, roles, such as father, and skills, such as playing chess (AOTA, 2020). To be an elementary school teacher, the person must have successfully completed a bachelor's degree and state issued license and certificate (U.S. Bureau of Labor Statistics, 2022). Although 1–4% of teachers hold no certification, or a waiver, emergency certificate, probationary certificate, or temporary certificate (National Center for Education Statistics, 2023). In the USA

approximately 77% of public-school teachers are female, and 23% are male (National Center for Education Statistics, 2023). Approximately 80% of teachers are white, 9% are Hispanic, 6% are black, 2% are Asian, and less than 1% are American Indian (National Center for Education Statistics, 2023).

As a refresher from Chapter 1, elementary school teachers help young children develop learning habits and social skills through intellectual and social development by means of activity-based and formal lessons (Stoffle, n.d.), and collaborate with students' parents and guardians. Elementary school teachers participate in regular professional development education (Stoffle, n.d.). There are pros and cons to being a teacher, and according to US News and World Report, being an elementary school teacher involves above average levels of stress (U.S. News, n.d.).

Teacher Environment

The structure of the school environment for teachers is similar to that of the students, as they navigate the different sections of the school together (Barrett et al., 2019). The school culture that impacts students also impacts teachers. Additionally, the "behind the scenes" culture, which often includes the support or lack of support teachers receive from administrators, must be considered as part of the environment (Nasra & Arar, 2019).

The environment may include professionals such as paraprofessionals, administrators, and related service providers, such as occupational therapy practitioners and speech and language pathologists, to help support students, in person or virtually (USA Department of Education, n.d.; USA Department of Education, 2017).

Most teachers in the USA have only a small amount of time allotted to make lesson plans (Darling-Hammond et al., 2010). Teachers are working under pressure, with limited appreciation and time, all while new educational initiatives are added to their workloads (Katariina et al., 2020). Within the school environment, the average elementary school class size in which the same group of students stays together for all or most of the day is 21 students (National Center for Education Statistics, 2018).

Teacher Occupation

Teachers are responsible for a wide range of occupations, including designing lesson plans to teach reading, writing, and math, while teaching specific skills to specific students, and developing relationships with all students (U.S. News, n.d.). The occupation of supporting students with ADHD can include modifying instruction, handouts, test delivery, classroom setup, classroom schedule, and a myriad of other tasks (CDC, 2022a). Teachers report feeling meaningful engagement and satisfaction when they are able to support students with special needs within their classroom (Steen & Wilson, 2020). The Elementary and Secondary Education Act (ESEA) requires standards of progress be measured by testing (Office of Elementary & Secondary Education, 2022). This emphasis on testing has resulted in having to target goals and standards that meet those of dominant society through lesson plans and classroom expectations (Cunningham, 2018; Sahlberg & Doyle, 2019). Teachers report improved job satisfaction when the following environmental factors and occupational supports exist reasonable expectations of teachers, well-behaved students, trusting and supportive environment, school administration's vision for improving learning, opportunities for professional

development, and support for data analysis (Hanks et al., 2020).

Conclusion

The collision of these two PEO models, and the poor occupational performance in each, cause significant stress for both teachers and students with ADHD (Krtex et al., 2022). This problem will be addressed by this proposed project directly at the occupation and environment level of the teacher's model, and indirectly to the respective components of the student's model. Go PEO will empower the teacher, and when possible, the student, to modify the environment and occupations of the student's model to turn the mismatch into a match, and poor performance to strong, successful occupational performance. Details of Go PEO will be further explained in Chapter 4. In conclusion, the PEO model does well to describe the barriers to occupational performance faced by both students and teachers when the environment and occupations do not match with the person.

CHAPTER THREE – Overview of Current Approaches and Methods

Introduction to Chapter Three

This chapter will describe the current approaches and methods being used to address the problem described in Chapter 2. These approaches aim to improve the social and academic success of elementary students with Attention Deficit Hyperactivity Disorder (ADHD) during the school day. A strategic approach to reviewing and analyzing evidence-based literature was used and is described in this chapter. A variety of interventions and accommodations have been studied, and these findings along with barriers to implementation are discussed. A conclusion will bring together all elements of the chapter.

Research Process

The following EBSCOhost databases were used: CINAHL, Child Development & Adolescent Studies, Education Full Text (H.W. Wilson), Psychology and Behavioral Sciences Collection, and Google Scholar, to answer the questions "What is the impact of the current elementary school staff, environment, tasks, and instruction on students with special needs/disabilities, such as ADHD?" and "What factors of the staff, environment, task, and instruction promote successful occupational performance (social and academic) in students with special needs/disabilities, such as ADHD?". Education, special education, psychology, occupational therapy, and the federal government are disciplines that are currently addressing this mismatch, with a variety of approaches. Students and adults with ADHD are also addressing this mismatch. Keywords and terms to locate relevant information included: ADHD, elementary or primary education, teacher

perception, education system, student success, burnout, school staff. A summary of the evidence about what program features were effective and for whom is in this section. A thorough, balanced, and accurate application of the evidence will be expressed.

Current Approaches

With a high prevalence, about 9.8% of children in the United States of America (USA), having ADHD, ADHD is a well-researched topic (CDC, 2019). An average of at least two students with ADHD are in each elementary school classroom. This makes answering the second research question an important one for all teachers, and students alike: "What factors of the staff, environment, task, and instruction promote successful occupational performance (social and academic) in students with special needs/disabilities, such as ADHD?". A variety of answers to this question are supported in the evidence-based literature (Moore et al., 2015). These findings are outlined in Table 3.1 and discussed more thoroughly in the paragraphs that follow.

Table 3.1 *Current Literature*

Intervention	References
Assignment and Classroom Accommodations, and Instructional Techniques	(CHADD, 2016c; Hewitt, 2017; Morin, n.d.; Roberts et al., 2020)
Behavioral Classroom Management and Peer Interventions	(Evans et al., 2013; Roberts et al., 2020)
Disability Awareness and Training for Students, Teachers, and Parents	(Boon, 2020; Corkum et al., 2019; Evans et al., 2013; Fabiano & Pyle, 2019; Hayden & Prince, 2020; Rossi, 2022; Shanholtz et al., 2020; Walters, 2022; Ward et al., 2022)
Pharmaceutical Intervention	(CDC, 2022b, Macphee et al., 2019)
Therapy (Occupational, Organizational Training, Music, Nature, Social Skills, Physical Exercise)	(Evans et al., 2013; Fabiano & Pyle, 2019; Frantz, 2020; Mitchell et al., 2017; Morrison, 2022; Rosalez et al., 2019; Jeyanthi et al., 2018)

Assignment Accommodations

Accommodations may be behavioral, environmental, evaluative, instructional, or organizational (Kircher-Morris, 2022). Several assignment accommodations have been studied and suggested for use in the classroom: decreasing assignment length, tailoring assignments to the child's level, extended time to complete assignments, visual representation of time, dividing an assignment into parts, provide flexibility on format, and consistent positive reinforcement. These accommodations are often incorporated into a formal plan, such as a 504 Plan or an Individualized Education Program (IEP) (CHADD, 2016c; Roberts et al., 2020; Morin, n.d.).

Classroom Modification

Classroom modifications that are currently being used in an attempt to support students with ADHD are seating the student in an area with fewer distractions, seating the student next to positive role models, and allowing students to take tests in a different room. Also, asking students to repeat instructions back to verify understanding, ignoring minor misbehavior, and using a speaking stick or other object that gets passed around during class discussions as a cue to indicate whose turn it is to speak (CHADD, 2016a; Hewitt, 2017; Morin, n.d.). These classroom modifications are suggested with the ADHD neurotype in mind, however, can be beneficial for all students.

Instructional Technique

Instructional techniques that are being used to support students with ADHD, and all students include the following: introducing the lessons by summarizing the activities of the whole lesson visually and verbally, presenting learning objectives in many ways,

describing behavior expectations, listing materials, and including time limits. When teaching the lesson, instructional techniques include sticking to the plan, reviewing the previous lesson, providing guidance to stay focused, checking for understanding, giving students enough time, providing extra support, breaking work into small steps, incorporating assistive technology, providing time reminders and modeling how to pace. Instructional techniques for ending a lesson include summarizing key points, and reviewing take-home assignments (CHADD, 2016b; Hewitt, 2017; Morin, n.d.).

Behavioral Classroom Management and Peer Interventions

Several positive behavior intervention supports are common classroom management techniques in the elementary school setting (Conradi et al., 2022). Some of these supports are neurodiversity affirming, while others are based on neurotypical norms, and can be damaging to students with ADHD (Kohn, 2020). Incorporating structured peer mediation or tutoring for social and academic skills is among the current behavior management strategies being used (Evans et al., 2013; Roberts et al., 2020).

Disability Awareness and Training for Students, Teachers, and Parents

As described in Chapter 2, attitude towards disability has an impact on the success of students with disabilities, including ADHD. Children's books featuring characters with disabilities, and staff trainings that include neuroimages of different brains, are among the delivery methods currently being used to positively influence disability attitude and ADHD knowledge (Hayden & Prince, 2020; Boon, 2020; Ward et al., 2022: Shanholtz et al., 2020). In existing examples of children's literature that features characters with disabilities, low incidence disabilities like visual impairment are more frequently

represented than high incidence disabilities like specific learning disability (Hayden & Prince, 2020). An interactive children's book titled "Wonderfully Wired" uses dancing brain cartoon characters to help both children and adult readers understand neurodiversity. The intervention is described in Appendix B (Scannell & Jacobs, 2022).

Teacher training, in a variety of formats, including in-person, and not in person, has been found beneficial for improving the outcomes of students with ADHD. The best format of teacher training is being studied (Boon, 2020; Corkum et al., 2019). Some teachers think of ADHD as a socially determined set of behaviors, and neuroimages of brains with ADHD can help teachers understand ADHD as a neurodevelopmental disability. This shift in understanding has been found to impact their pedagogy and classroom management (Boon, 2020). Parent training has also been found a beneficial support for students with ADHD outside of school (Evans et al., 2013; Fabiano & Pyle, 2019)

Pharmaceutical

Stimulant and nonstimulant medication has been found to improve student functioning in the areas of following classroom rules and in academic productivity (Macphee et al., 2019). This is a commonly used treatment, and as of 2016, the most recent survey time, 18 % of children ages 2–5 were taking medication to treat ADHD, and 69% of students ages 6–11 years old were taking medication to treat ADHD. Of the 77% of students who were receiving any treatment for ADHD, 30% were treated with medication alone (CDC, 2022b).

Occupational Therapy

Occupational therapy practitioners (OTPs) are currently supporting students with ADHD in schools, specifically in areas related to sensory processing, fine motor function, and participation, which may include social interaction and self-regulation for students with ADHD and the larger student body. Most school-based OTPs report at least a quarter of their caseloads being composed of students with ADHD (Ianni et al., 2020). Occupational therapy practitioners are equipped to support organization training, which teaches students adaptive skills. Organization training has met the criteria for a well-established treatment for both elementary school students with ADHD and young adolescents with ADHD (Evans et al., 2013; Fabiano & Pyle, 2019).

Music

Music in a variety of forms is currently being used to support students with ADHD. Call and response instruction and routines embedded into the environment have been found to help with student engagement. White-noise during independent work time has been studied on a small scale and found to decrease off-task behavior, and to be favorable by staff and students. Additionally, music teachers and special education teachers can collaborate to incorporate facets of music education and therapy into lesson plans (Frantz, 2020; Mitchell et al., 2017; Rosalez et al., 2019).

Nature

Nature-based environments, such as increased green space, have been found to increase the participation of students with ADHD. While a complete transition from an indoor school environment to an outdoor school environment would be difficult to

implement, there are many ways school staff can incorporate elements of green space, such as having a few potted plants in the classroom, increasing natural lighting into the room, posting posters of natural scenes on the walls, or completing sedentary activities that require limited materials, like silent reading, outside (Morrison, 2022).

Physical Exercise

A variety of exercise programs have been reported to be beneficial in improving motor skills, physical fitness, attention, and social behavior in children with ADHD. Allowing students to move around the room to do their work while standing, sitting on the floor, or moving between desks is an example of physical exercise integrated into the classroom (CHADD, 2016a; S et al., 2018).

Barriers to Implementation

With so many known and studied supports to promote social and academic success for students with ADHD, why is there still a mismatch resulting in negative schooling experiences for elementary students with ADHD (CDCa, 2022, Rigoni et al., 2020)? Perhaps the problem of the mismatch lies most specifically in the barriers to implementing these supports. Several quantitative studies measure the barriers faced by teachers when attempting to implement supports for students with ADHD. The findings suggest that lack of time, class size, many students with disabilities (Szép et al., 2021), lack of knowledge of supports (Gaastra et al., 2020), funding, competing demands, and feeling burnt out or frustrated (Lawson et al., 2022), were among the most prominent barriers.

A review of the literature to determine what structures and supports promote

implementation of support was conducted. Information suggests that training that incorporates video, opportunity for discussion with colleagues, and the opportunity to return to the content over time, are favorable in promoting educators' ability to implement supports for students with ADHD. Integrated support from related service providers has also been found beneficial for successfully implementing supports for students with ADHD (Gaastra et al., 2020; Ward et al., 2022; Lasisi et al., 2017; Harju-Luukkainen et al., 2018; Cahill & Bazyk, 2019).

There are barriers that prevent educators from implementing supports to promote social and academic success in students with ADHD. Interventions that address the barriers to success of students with ADHD must consider the barriers faced by educators as well. This understanding of barriers faced by both educators and students with ADHD has been heavily influential in the design of the proposed intervention, Go PEO, which is explained in Chapter 4.

Analysis of Research

The strength of this research is that it is accessible and easy to find, once again, because of the prevalence of ADHD. A weakness is that the studies inconsistently include the voices of the students with ADHD who are being supported, and instead base findings and changes in behavior on observation, without any narrative from the students. The implication of this weakness is that the voices of students with ADHD need to be incorporated into studies as a way to measure changes in behavior, instead of relying only on the valuable, but as a stand-alone, potentially misinforming, insights from teachers' observations of students. The voices of students with ADHD are being featured in some

formal and informal studies, although this information is not as readily accessible as the type of studies mentioned above (Barrow, 2008; Singh, 2012; ADHD Voices, n.d., Puvanendran & Nagaraj, 2014).

Of the researched classroom supports, some are found to be more neurodiversity affirming, and impactful, from the perspective of the student with ADHD. Specific features of the interventions that are most likely to be effective in supporting and benefiting, while also empowering the students with ADHD are important and need to be incorporated. For this reason, future research studies need to incorporate the perspective of the student with ADHD.

Implications for Project

A review of the literature produces two key findings that will guide program design: (1) there are many proven supports for students with ADHD, however teachers face barriers in supporting students with ADHD (2) it is easiest for teachers to implement supports when provided the opportunity to access planning materials in video, literature, or collegial meeting format, when there is time to implement /integrate and then reflect and modify, and when related service providers provide integrated support.

Conclusion

In conclusion, a variety of methods to support students with ADHD in elementary school are currently being used and studied — from accommodations that aim to modify the school environment, to trainings that aim to build skills and influence perceptions of staff and students alike. None of these methods, however, are a one stop shop designed with a framework to allow for easy implementation. The strengths of current ADHD

support will be further optimized, and the flaws of current supports will all be considered in the Go PEO design outlined in Chapter 4.

CHAPTER FOUR – Description of the Proposed Program

Introduction to Chapter Four

This chapter will describe the proposed program. The occupational performance and mental health of students with attention-deficit/hyperactivity disorder (ADHD) suffer when the elementary school environment and instruction do not match the ADHD neurotype (CDCa, 2022; Rigoni et al., 2020). Teachers experience barriers when supporting students with ADHD due to this mismatch (Gaastra et al., 2020; Lawson et al., 2022; Szép et al., 2021). The Go PEO initiative proposes to address this problem and improve the mental health of both students and staff in the elementary school setting.

Description of Go PEO

The author's proposed initiative is the development of a free online application (app) called Go PEO which will be a guided problem-solving tool using the Person, Environment, Occupation (PEO) model to plan and implement evidence-based and neurodiversity affirming supports for elementary students with ADHD in the school setting. Go PEO's name comes from the Person Environment and Occupation model, which is used to frame the problem-solving process facilitated by the app. Go PEO is pronounced as "Go P.E.O.".

It is an app intended to be used in the context of a team meeting at school, or by an individual staff member looking for guidance in supporting a student. Teachers start by inputting information about a challenging situation a student is facing. When possible, students would be directly involved in inputting information to the app, and when not possible, observations and adult reports would be used to input this information. Teachers

will be able to save their work and use the app from start to finish in 15 minutes or less. It will create data tracking sheets and action item lists for intervention implementation and monitoring. The proposed method of delivery will be online through a browser or through the App Store for Android and Apple phones and computers. Although minimal personal information will be gathered, the app will be Family Educational Rights and Privacy Act (FERPA) compliant. A video demonstration of the layout and application features is available in Appendix I.

Theories Guiding Intervention

Person, Environment, Occupation Model

To create supports that will be effective in assisting students in the school environment, the PEO model is being used. Teachers gather student and situation data through observation of a reoccurring difficult task or space, and then input that information into the app. When that information is processed by the algorithm, a list of relevant and student-specific supports will be generated. An example of a reoccurring difficult task or space is if a student was consistently running, yelling, and bumping artwork off the wall during the transition from the lunchroom to the classroom (Woodroffe, 2022).

Adult Learning Theories

Teachers who will be using this app are busy and often have limited time to access current ADHD information due to the demands of their profession. Knowles' andragogy principle that adults learn on a need-to-know basis will guide the app design, by getting teachers the information that they need to know to improve the day to day of

their class (Knowles et al., 2015). Experiential learning theory, another adult learning theory, also supports this method of teacher education, by having the teachers actually do a problem-solving session while learning about the problem-solving process, ADHD, and factors that impact performance (WGU, 2020a).

Transformative Learning Theory

Transformative learning theory suggests that learning occurs when a person is faced with a difficult situation that causes reflection of beliefs. This has guided the inclusion of learning check questions about common ADHD misconceptions which could be fundamentally impacting support of students with ADHD (WGU, 2020b). Training will also include neurodiversity awareness, such as what realistic performance for a student with ADHD in different tasks and environments may be.

Based on the evidence reviewed in Chapters 2 and 3, the following program features/approaches are likely to be effective with teachers: auto generated elements, multiple choice and fill-in questions, guided completion, and algorithm generated ideas and implementation tips. The program draws upon existing literature and relevant policy and systems information in its design to ensure its feasibility, relevance, and scientific soundness. Further models of Go PEO would like to increase student interaction and will include elements of gamification (Alabdulakareem & Jamjoom, 2020).

Goals of Intervention

The main goals of the Go PEO initiative are to: (1) Increase teacher understanding of neurodiversity (2) Increase the efficacy of ADHD support implementation (3) Improve academic performance of students with ADHD (4) Improve social performance of

students with ADHD. These four goals work and improve together. The collective success of all four initiatives will be important. This process is described in Appendix B.

Community of Interest

At the micro level, the community of interest are students with ADHD, and their teachers. At a meso level, stakeholders include the school buildings and districts utilizing the application. At the macro level, policymakers who create policy for mental health and education, as well as governmental agencies who manage funding for public education, are the community of interest.

Barriers and Solutions

Barriers to implementation are not finding a web-based designer, poor carryover and troubleshooting available for users, and that users may not have technology skills to use an application. Additionally, getting teacher buy-in to try something new may be a challenge for implementation, because new tools inherently come with a learning curve of learning to use the new tools. Key personnel play important roles. The author oversees the theoretical and conceptual design of the tool. A web designer is needed to put that idea into digital form. Teachers are responsible for navigating the application when using it, and administrators are responsible for supporting and promoting teacher and student use of the tool. To recruit a web designer, local university computer design students would be contacted through social media and email. Administrators and teachers would also be reached through social media, with posts notifying them of the option to use this great tool. Posts would include videos of students and teachers who prototyped the tool sharing their positive experiences.

Conclusion

In conclusion, Go PEO is a proposed free application for teachers to access guidance on planning and implementing modifications to the environments and occupations of elementary school to improve the occupational performance of students with ADHD. It has been created with the overarching systems, environments, and specific user values in mind, making it an easy-to-use system, that is accessible digitally to educators, and it includes indirect and direct education for users throughout the process. It is currently in the development stage.

Supplemental Resources

Although not part of this doctoral project, available as a supplemental resource, co-created by the doctoral paper author is a children's book called "Wonderfully Wired." This children's book, created in the spirit of universal design, demonstrates that brains are wired differently, and that the same task can be done with the same success but different methods. It allows teachers an easy-to-use intervention to create an inclusive neurodiversity affirming classroom environment amongst peers and staff. A copy of the book in video, audio, or print versions is available at Appendix J.

CHAPTER FIVE – Program Evaluation Research Plan

Introduction to Chapter Five

Go PEO is a proposed application (app) that is in the development stage. It will be an intervention for elementary school teachers to use for the purpose of planning and implementing support for students with ADHD. This chapter will describe the proposed evaluation plan for this proposed intervention. The chapter will include an explanation of the purpose of the evaluation, the simplified logic model, and the evaluation process, including evaluation methods, questions, and data management plan. A conclusion will summarize the information of this chapter.

Simplified Logic Model

A simplified logic model in Appendix C illustrates the program elements. It includes client resources and intervention activities, as well as outputs and outcomes across different lengths of time. There are two versions of the logic model, a simplified version shown in Appendix C and the full version shown in Appendix B. The simplified version will be provided to stakeholders to promote their accurate understanding of the intervention program. Potential impacts and benefits to the stakeholders will be clearly stated in the logic model as well.

Evaluation Purpose

This proposed evaluation will seek to measure intervention outcomes at the individual and program level. The intervention, Go PEO, will be considered the independent variable. Both short- and long-term outcomes will be considered dependent variables. Short-term outcomes include: (1) the extent to which participants increase their

understanding of neurodiversity, and (2) the efficacy of implementation of strategies to support students with ADHD. The information gathered in the short-term will guide amendments to the Go PEO app design. Long-term outcomes include: (1) the impact of this intervention program on the social performance of students with ADHD and (2) the impact of this intervention program on the academic performance of students with ADHD. The information gathered in the long-term will serve to support future activism and plans to restructure the educational system to promote success for a greater variety of neurotypes. It is essential in all interventions to include evaluation to ensure safety, fidelity, and quality in interventions.

Evaluation Process

To gather information from a variety of educators in a variety of means, a variety of evaluation methods are being proposed, as outlined in Appendix D. These methods include semi-structured interviews, pre- and post-tests, and online surveys. These methods will be used to gather both formative and summative information.

Semi-structured Interview

Ten elementary school educators who used Go PEO will be recruited through a convenience sample of the elementary school where the researcher works, for interviews. Teachers, paraprofessionals, related service providers, and administrators may be included if they meet the inclusion criteria of not yet having used Go PEO at the time of recruitment. An Institutional Review Board (IRB) approval will be completed through Boston University with the academic mentor of the researcher included in the process. Codes would be used to replace participants names in hard copies of interview

transcription and pre and posttests. Those copies would be kept in a locked location.

Audio recordings of the interviews would be saved in a secure, password protected

google drive and would only include mention of participant first names. Passwords will

only be available to the study staff. Questions from Appendix E will be included in the

interview process. Semi-structured interviews with the ten educators will be completed

during the two staff lunch periods, making for an anticipated five teachers per group,

each meeting for 30 minutes. The researcher will conduct the interview to maintain

confidentiality and consistency, and the interviews will take place in-person in the staff

lounge. The focus of the interviews is to gather formative information about user

experience with the app.

Online Surveys

In addition to the interview evaluation of 10 participants, a widespread use of

online surveys would be used for formative evaluation. Inclusion criteria for the online

survey includes any elementary school educator who has used Go PEO, independently or

collaboratively. To use Go PEO, educators will need to enter their email address. The

online survey will be sent to educators via that same email address and will include three

Likert scale questions about the time, navigation, and organization of the app. No

personal or identifying information will be gathered.

Pre- and Post- Test of ADHD Knowledge

There are five learning check questions in Go PEO. The questions are a

combination of multiple choice and true or false, asking about the topics of ADHD and

support implementation. They are listed in Appendix I. Before their first use of Go PEO,

the ten study participants will be emailed the five learning check questions to answer individually. At that time, the correct answers will not be revealed to the participants. Then, during app use, the same learning check questions will be asked of the ten study participants. The correct answers will be provided at that time. The accuracy before and after will be compared and will be used to determine if problem-based digital learning is an effective intervention for educator training.

Pre- and Post-Student Grades

The 10 study participants will each be using the Go PEO app to plan and implement support for a student with ADHD. After selecting the student to support, and before using Go PEO, the grades of each of those ten students will be recorded. These grades will be compared to the student's grades during and after Go PEO use, to determine any changes in academic performance. Since many elementary students receive ratings on participation instead of formal letter grades, those ratings will be considered in place of grades.

Pre- and Post-Student Social Performance Teacher Rating Scale

The ten study participants will each be using the Go PEO app to plan and implement support for a student with ADHD, totaling 10 different students. After selecting the student to support, and before using Go PEO, each participant will complete an online social performance rating scale based on observation of the student's confidence, joy, and participation in the school day of each of those ten students. This same rating scale will be completed during and after use of Go PEO and the findings will be compared to determine any changes in social performance. A student completed rating

scale has been considered, however is not being proposed at this time, due to the

additional assent forms and parent permissions required to complete. It is proposed that

future studies incorporate these elements, to get direct student feedback.

Review of Strategy Data

Go PEO provides users the option to track data on paper by hand, digitally on a

form, or digitally via email reminders. The data collected by the 10 study participants

during the two-to-four-week implementation period will be reviewed by the researcher

and the researcher's academic mentor, in order to determine how consistently the

strategies were implemented. This review will provide information about the second

short-term regarding efficacy of support implementation.

Evaluation Questions

Appendix E is a listing of potential research questions for program evaluation that

will be asked of the educators who use Go PEO. In Appendix E, the questions are

grouped by community of interest, based on who the findings of the questions should be

disseminated to. Different communities of interest may find relevance in specific research

outcomes and findings that most directly impact their work and life. This list of potential

questions will be sifted through and generated to turn into a manageable, final list of

questions for use on the formative and summative surveys. In conclusion, to ensure the

effectiveness of Go PEO, a combination of formative and summative evaluation surveys

will be conducted. Findings will be used to guide future edits to the application.

Data Management Plan

The audio recording of each interview will be processed through NVivo, which is made available to the researcher through Boston University. NVivo will identify themes in the interviews. To increase the rigor of the analysis, the researcher will structure questions that will lead to answers to the finalized research questions. Content experts, such as researcher's academic mentor, and elementary school teachers will be asked to review the analysis and provide their reflections.

All the quantitative data analysis will be completed on Qualtrics, which is provided by Boston University, and has the capacity for descriptive analyses. The participants will access the survey from a computer or tablet using the school's secure internet connection. Staff from Boston University's post-professional doctorate occupational therapy program and Statistical Package for the Social Sciences (SPSS) will be used for the statistical analysis of the data.

Conclusion

Go PEO, a proposed intervention and independent variable will be evaluated to measure impact on four different dependent variables, two of which are short-term and two of which are long-term. The initial evaluation process is proposed to include a convenience sample of ten elementary school educators, who will participate in pre- and post- tests, as well as semi-structured interviews. All users of Go PEO can be included in the evaluation process via an emailed survey. The findings of the proposed evaluation plan could have implications not only for improving Go PEO, but for guiding future interventions to support elementary school students and educators.

CHAPTER SIX – Dissemination Plan

Introduction to Chapter Six

Elementary students with Attention Deficit Hyperactivity Disorder (ADHD) face barriers to school success, and teachers face barriers in supporting those students. Students with ADHD may have diverse ways of thinking, processing, and expressing information that do not match the expectations of the classroom, assignment, or test. Teachers have limited time, competing demands, and lack of training on ADHD support.

Go PEO will be a digital application that provides student-specific, neurodiversity affirming, and evidence-based supports and accommodations to improve the academic and social experience of elementary school students with ADHD. It is designed for teachers to use, to help generate specific strategies based on observed student behaviors. Teachers start by entering information about a student and a school situation that is challenging for the student. Then Go PEO 's algorithm generates a list of accommodations to the instruction, environment, or the task. The teacher, and team (student included when appropriate) choose which strategies to use, which are then broken into user friendly data collection sheets and action item lists. The process of using the app, starting with a problem, and concluding with a solution, takes 15 minutes or less with Go PEO.

Dissemination goals

Long-Term Goal: Within five years of Go PEO's project evaluation, with assistance from teachers and students with ADHD, the USA Department of Education will amend standardized testing policies to include a more diverse system of measuring

student success, in order to capture and celebrate a wider range of student thinking, processing, and outputting.

Short-Term Goal: Within six months of Go PEO's creation, it will have been used from start to finish, by at least 500 elementary school educators to generate intervention plans.

Target audiences

Primary Audience: The Department of Education in the USA is the primary audience for the long-term goal, since they have the direct authority to accomplish the long-term goal of this dissemination plan, which is to change policy regarding standardized testing in schools. Teachers in the USA are the primary audience for the short-term goal, since they have the power to accomplish the short-term goal, by using the app and promoting the app. The app is designed to help teachers, and thus an effort must be made to ensure they know that this program is available. Additionally, they will be powerful in influencing the long-term goal.

Secondary Audience: Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD) is the secondary audience. CHADD is an organization that advocates for people with ADHD through education, networking, and support. Their outreach is wide, and thus they may be valuable to have paying attention to the dissemination of the Go PEO findings.

Key messages

To The Department of Education: When teachers are supported in providing instruction, tasks and environments that match student neurotypes, the teachers and

students are healthier and happier. Happier and healthier teachers and students improve the quality of education in the USA and decrease the need for financial or policy reform. With the help of these teachers, and students with ADHD, please consider amending the standardized testing regulations to include standards that capture the strengths of students with ADHD.

To Teachers: There are many ways to make modifications to instruction, tasks, and environments that result in an improved school experience for students with ADHD. Go PEO enables you to smoothly identify and implement these modifications. Please use the free Go PEO application and refer your colleagues to do the same.

To CHADD: Go PEO can improve the school experience for students with ADHD, while educating school staff on ADHD. It is a useful tool that should be made readily available to school staff. Please share Go PEO with your network.

Messengers

To The Department of Education: A well-known neurodivergent professor who advocates for neurodiversity awareness and rights will be approached and asked to be an individual messenger. An esteemed college professor is a credible person to address The Department of Education. The National Education Association (NEA) would be an organization level messenger. The Department of Education is familiar with the power of the NEA, which is the largest labor union in the USA. With its size, the NEA has a significant influence on campaigning for preferred candidates and proposals, making the NEA a credible organization to The Department of Education.

To Teachers: An individual messenger will be nominated by a family of a student with ADHD, or by the student with ADHD themself, during a publicized campaign inviting families and students to nominate a teacher who demonstrated the ability to modify instruction, tasks, and environment to celebrate neurodiverse students. All nominees will be featured, and one will be selected by the project lead, based on availability and willingness to speak on behalf of Go PEO. The experience of being a teacher is a unique one, and thus teachers may be more likely to listen to someone who knows what it is like to perform the same job. The NEA will be a credible organizational messenger, as many teachers are part of the NEA, making it a familiar name that already has regular communication with teachers via digital and physical mailings.

To CHADD*:* The teacher messenger that wins the vote described in the previous paragraph would be an individual messenger to CHADD. CHADD services educators directly, with a myriad of education resources on their website, thus they value what teachers have to say. The project lead will also reach out directly to CHADD to form a friendly and collaborative partnership, with an emphasis on a shared mission. There would not be an organization level messenger, as the individual approach will more appropriately match the goal of reaching CHADD, a secondary audience, as a supporter.

Dissemination Activities, Tools, Timing, and Responsibilities

Steps to reach The Department of Education*:* The first step is to utilize electronic media by creating a website that houses the brief of the results of program evaluation and the key message. This step will be completed by the project lead. The second step is to utilize written information. A graduate student volunteer will send

representatives a digital and a physical version of the brief. If there is no response, follow-up of sending the brief in each form again will take place. The third step is to utilize person-to-person contact by supporting the lobbyist for the NEA, who is already in face-to-face conversations with policy makers. The project lead will meet with them and provide verbal education on the key message.

Steps to reach Teachers: The first step to reaching teachers is to utilize electronic media. The project lead and graduate student volunteer will collaborate to create a website that houses the results of the study in the form of a list with bullet point highlights. The website will also feature the 30 second – two-minute video nominations for teacher messenger that the general public made of teachers who demonstrated the ability to modify instruction, tasks, and environment to celebrate neurodiverse students. This will make the key message clear through text and audiovisual, real-life examples. The second and final step is to utilize person-to-person contact. The project lead and graduate student volunteer will attend in-person elementary school teacher conferences as an exhibitor and presenter and offer their presence at district wide professional development days.

Steps to reach CHADD: The first step to reaching CHADD is to utilize electronic media. The project lead will email and call the director of CHADD to introduce themselves, and the Go PEO project and evaluation results. In doing so, the project lead will make it clear that the only request is that CHADD would give a formal acknowledgement of approval of Go PEO that would reach the members of the CHADD network. Following the initial ask, the teacher messenger will also utilize electronic

media and email the director of CHADD with a personal summary of their experiences using Go PEO in the classroom, for CHADD to use in their formal acknowledgement of Go PEO.

Budget

In-kind resources, such as free web design and the power of digital communication will be used as much as possible to keep dissemination costs low. The items and costs in Appendix F would be required to conduct the proposed dissemination plan.

Evaluation

The dissemination efforts will be determined successful if the short- and the long-term goals have been met. The short-term goal is that within six months of Go PEO's creation, it will have been used from start to finish, by at least 500 elementary school educators. The long-term goal is that within five years of Go PEO's project evaluation, with assistance from teachers and students with ADHD, The Department of Education will amend standardized testing policies to include a more diverse system of measuring student success, to capture and celebrate a wider range of student thinking, processing, and outputting. If these goals are met, the elementary school experience for students with ADHD will be significantly improved both socially and academically.

Conclusion

To effectively make change based on the impactful findings from the Go PEO project, a strategic approach for dissemination is required. In conclusion, the use of multimedia methods, to specifically target the primary audiences, the USA Department of

Education, and teachers, as well as the secondary audience, CHADD, will make system

level changes that will improve the experience of students with ADHD, and their

teachers.

CHAPTER SEVEN – Funding Plan

Introduction to Chapter Seven

This chapter will begin with a description of the proposed program. Next, an assessment of available resources, and the cost of needed resources will be described. Lastly, potential funding sources, including grants and rewards, will be explained. This is an essential part of the planning process for the Go PEO project.

Program Description

Elementary students with attention deficit hyperactivity disorder (ADHD) face barriers to school success, and teachers face barriers in supporting those students. Students may have diverse ways of thinking, processing, and expressing information that do not match the expectations of the classroom, assignment, or test. Teachers have limited time, competing demands, and lack of training on ADHD support. Go PEO is a digital application that provides student-specific, neurodiversity affirming, and evidence-based supports and accommodations to improve the academic and social experience of elementary school students with ADHD. It is designed for teachers to use, to help generate specific strategies based on observed student behaviors. Teachers start by entering information about a student and a school situation that is challenging for the student. Then Go PEO's algorithm generates the list of accommodations to the instruction, environment, or the task. The teacher, and team (student included when appropriate) choose which strategies to use, which are then broken into user friendly data collection sheets and action item lists. The process of using the app starting with a problem and concluding with a solution takes 15 minutes or less with Go PEO.

Available Local Resources

An abundance of local resources are available for this project. They include human resources, funding opportunities, free online software for app development, and program evaluation. Several expenses, such as Wi-fi, are already being paid for and would be paid for, regardless of the author's involvement in this project. The costs of these expenses will be included in the budget. All in-kind volunteers will be thanked via social media and on the app itself with a written statement of their contributions. These available resources are described in Appendix G.

Cost Resources

Despite the rich availability of in-kind resources, several categories of resources, including app development, will instead utilize paid versions of products and services to ensure a well-designed product that can be sustainably managed. To honor the individuals who will provide their consultation based on lived experiences and training, consultants will be paid for ongoing consultation, after the initial 10 hours or less of volunteering. Travel will be an additional cost, as will the other means of dissemination. Costs for the first two years are being considered and will be categorized by which phase of development they are needed for. The first year, which will be the most expensive, is considered the "Design Phase" and the second year will be considered the "Maintenance and Marketing Phase." Appendix H outlines these cost resources.

Potential Funding Sources

To ensure the quality of app creation, dissemination, maintenance, updating, and debugging, funding is essential. Seeking a variety of sources for funding will help

diversify the project's funding sources, to provide increased security, and thus sustainability of the project. In the pursuit of funding sources, the opportunity to network and add additional in-kind resources presents itself. The goal of identifying funding is to cover the $47,220 total expenses and have money for sustaining work required past year two. At this time, the app will be offered for free use to educators. This decision is important to the Go PEO creators to maintain accessibility of the app.

Local Community Grants

The Superior Health Foundation has a "Pilot" Grant to provide seed money for start-up projects to prove ideas and is open to any resident of Michigan's upper peninsula who wishes to improve the health of upper peninsula residents. The maximum award amount is $2,500. More information is available at https://superiorhealthfoundation.org/grants/pilot-project-grants/ online.

Award Funding

CHADD's Young Scientist Research Awards Program is a program for researchers new to the ADHD field who are making contributions to the understanding of ADHD. It is awarded to two people each year, and includes an unrestricted cash award of $1000, and an allowance to cover most conference-related expenses, plus benefits like recognition and promotion of work. As Go PEO is evaluated, it will contribute meaningful information to the understanding of ADHD, and how to support students with ADHD. The next cycle of applications will be available online in February 2024. More information is at https://chadd.org/research/ online.

The Amber Grant is for women who are passionate about their business, and past

recipients have ranged in business sectors, from scientific invention to baking. The award

amounts are $10,000 or $25,000. Applications are online and include a $15 application

fee. Awards are granted monthly. More information is at

https://ambergrantsforwomen.com/get-an-amber-grant/apply-now/ online.

After the first year of Go PEO's design, the project would be eligible to apply for

the Cartier Women's Initiative Award. The award amounts vary for the first, second, and

third place applicants and are in amounts of $100,000, $60,000, and $30,000,

respectively. In addition to the financial provisions, the award includes human capital and

social capital support. Applicants must have licensed operations for at least one to six

years prior to date of application and must be a for-profit business. Past recipients live

around the world, as the Cartier Women's Initiative awards the top three applicants of

each geographic region. More information is available at

https://www.cartierwomensinitiative.com/regional-awards online.

Advertisement Funding

Advertisements on free apps can bring in money to allow the app to continue to

be offered for free. Being mindful that the advertisements do not interfere with or slow

down the teacher experience, they will be added to Go PEO. The learning check

questions that are incorporated throughout the document will each include the

opportunity for a designated company advertisement logo. In the current design, which is

subject to change, there are five learning checks, and thus the opportunity to sell

advertisements to five organizations. The use of selling advertisements will help ensure

steady flow of money to sustain the app as grant and award money is used.

Conclusion

Go PEO will be an impactful app that will make real and positive changes for students with ADHD and their teachers. Go PEO provides teachers with the information and processes they need. A strong list of available in-kind resources and several grant and award opportunities, as well as selling advertisements, will be used to fund the project, which is anticipated to cost $47,220 over the first two years. Most costs will be incurred in year one, during the design phase. With the strategic plan outlined in this funding plan, Go PEO will be positioned to be accessible to all educators.

CHAPTER EIGHT – Conclusion

Introduction to Chapter Eight

This doctoral project represents an innovative plan to support a large population of youth and their educators. It will be an accessible resource for any school staff who has access to the internet. In this final chapter, a summary of each chapter will be provided. This doctoral project contained eight chapters. The first three chapters laid the groundwork for the project by discussing the problem, theories of the problem, and current approaches to the problem. The following chapters described the intervention by detailing its contents, evaluation plan, dissemination plan, and funding plan. In the following appendix, examples of the project are provided to bring it to life through video, case study, and supplemental materials.

Problem Chapters

Chapters 1 through 3 outline the problem, theories of the problem, and current approaches to the problem. The problem is rooted in a mismatch between person, environment, and occupation in elementary schools that places extra obstacles on the path to school success for neurodivergent students with attention deficit hyperactivity disorder (ADHD), compared to the average student without ADHD (CDCa, 2022, Rigoni et al., 2020). The Person, Environment, and Occupation (PEO) model is used to illustrate this problem by showing how the person, environment, and occupation interact regularly over time and space. The better the fit, or compatibility, between the person, environment, and occupation, the greater the occupational performance will be (Law et al., 1996). A variety of interventions and accommodations have been used to address this problem, including

therapies, instructional techniques, and pharmaceutical interventions, among others. Barriers to implementing these interventions and accommodations exist and limit teachers' ability to successfully implement such strategies. Understanding the problem provides information that guides the process of designing the intervention.
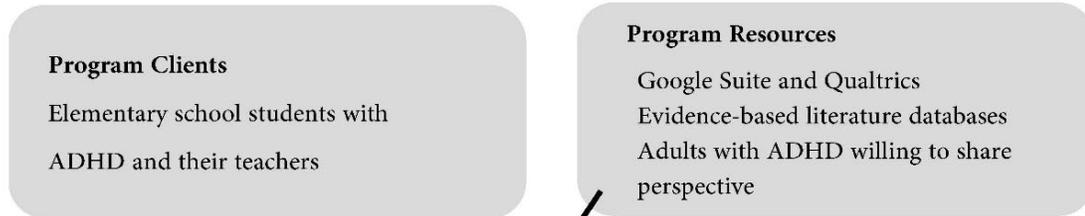
Intervention Chapters

Chapters 4 through 7 describe the project by detailing its contents, evaluation plan, dissemination plan, and funding plan. The intervention will be a free online application called Go PEO which is a guided problem-solving tool using the PEO model to plan and implement evidence-based and neurodiversity affirming support for elementary students with ADHD in the school setting. It will be evaluated through a series of surveys and disseminated through local and national education agencies. App design will be the greatest expense in the funding plan, and grants and awards, as well as advertising will be used to cover these costs. Chapter 4 and Appendix I bring this intervention to life. The Go PEO intervention will improve the well-being of students and elementary school educators, including occupational therapy practitioners, by saving them time and energy while planning and implementing supports for students with ADHD.
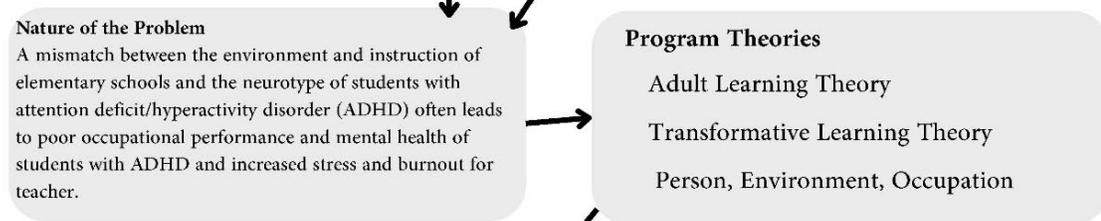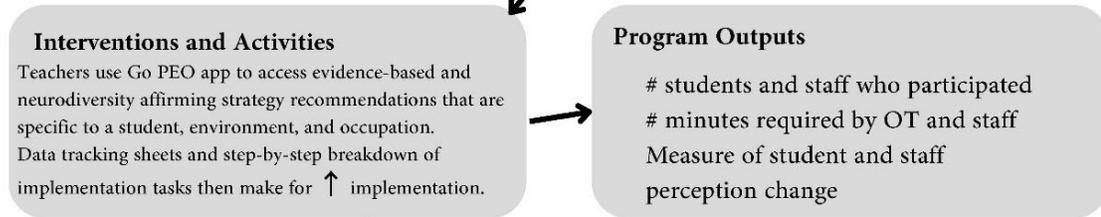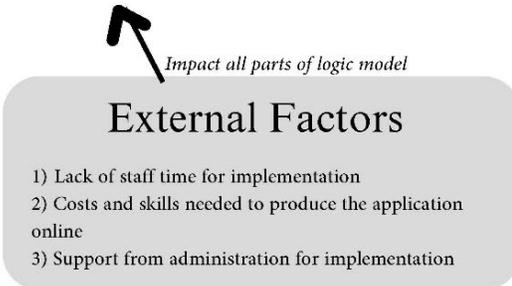
APPENDIX A – Model of the Problem

Person
Student with ADHD Neurotype
Grades kindergarten - 4th

Occupation
Complete classwork and make friends

Mismatch#1
=Failure

Environment
Elementary school hallway, classroom, gymnasium, cafeteria, playground, federal and state testing requirements

Person
Elementary school teacher
Grades kindergarten - 4th

Occupation
Modify instruction and environment to support student with ADHD

Mismatch #2
= Burnout

Environment
Large class size, limited money, limited training ,0-1 classroom aides, 20-30 students

APPENDIX B – Logic Model

Inputs

Program Clients

Elementary school students with

ADHD and their teachers

Program Resources

Google Suite and Qualtrics
Evidence-based literature databases
Adults with ADHD willing to share
perspective

Problem and Theories

Nature of the Problem
A mismatch between the environment and instruction of elementary schools and the neurotype of students with attention deficit/hyperactivity disorder (ADHD) often leads to poor occupational performance and mental health of students with ADHD and increased stress and burnout for teacher.

Program Theories

Adult Learning Theory

Transformative Learning Theory

Person, Environment, Occupation

Activities and Outputs

Interventions and Activities
Teachers use Go PEO app to access evidence-based and neurodiversity affirming strategy recommendations that are specific to a student, environment, and occupation.
Data tracking sheets and step-by-step breakdown of implementation tasks then make for ↑ implementation.

Program Outputs

\# students and staff who participated
\# minutes required by OT and staff
Measure of student and staff
perception change

Outcomes

Short-Term Outcomes

↑ understanding of neurodiversity, which helps understanding of ADHD

↑ efficacy with implementation of strategies to support students with ADHD

Intermediate Outcomes
At 1 month post –

↑ number of school staff and students able to explain neurodiversity and give a personal example of their own unique strengths and strategies

↑ effectiveness ratings of strategies trialed

Long-Term Outcomes

↑ ADHD student social performance

↑ ADHD student academic performance

↑ Support for changes to the education system, such as a shift to universal design for learning to promote fit between a greater variety of neurotypes

Impact all parts of logic model

External Factors

1) Lack of staff time for implementation
2) Costs and skills needed to produce the application online
3) Support from administration for implementation

APPENDIX C – Simplified Logic Model

Client Resources ⬇	● Clients: Elementary school students with ADHD and elementary school educators. ● Resources: Google Suite, Qualtrics, Databases, Adults with ADHD.
Intervention Activities ⬇	● School teams use Go PEO to generate, implement, and measure custom strategy recommendations.
Program Outputs ⬇	● Number of students and educators who participated. ● Number of minutes required by school staff to use. ● Measure of student and staff perception change.
Short-Term Outcomes ⬇	● The extent to which participants increase their understanding of neurodiversity. ● The efficacy of implementation of strategies to support students with ADHD.
Intermediate Outcomes ⬇	● The impact of this intervention program on the social performance of students with ADHD. ● The impact of this intervention program on the academic performance of students with ADHD.
Long-Term Outcomes ⬇	● Increase support for education systems level changes to fit greater variety of neurotypes.

APPENDIX D – Proposed Evaluation Methods

Evaluation Method	Measured Outcomes	Participants
Semi-Structured Interview Conducted by researcher for 30-minute period during staff lunch in reserved conference room, with questions focused on user experience with app.	**Formative:** Aim is to learn about user experience to maintain or improve app for future users	Convenience sample of 10 elementary school educators
Online Surveys Three Likert scale questions on experience emailed to all users of Go PEO	**Formative:** Aim is to learn about user experience to maintain or improve app for future users	Any user of Go PEO
Pre- and Post- Test of ADHD Knowledge Five learning check questions before initial app use, then again during app use	**Formative and Summative:** Aim is to learn about user experience in order to maintain or improve app for future users. Aim is to contribute to the literature about teacher training methods and delivery.	Convenience sample of 10 elementary school educators
Pre- and Post- Student Grades Student's grades before, during and after Go PEO use	**Summative:** Aim is to measure the effectiveness of the intervention on changing student success at school.	Convenience sample of 10 elementary school educators
Pre- and Post- Student Social Performance Teacher Rating Scale Observations of student confidence, joy, and participation before, after and during Go PEO use	**Summative:** Aim is to measure the effectiveness of the intervention on changing student success at school.	Convenience sample of 10 elementary school educators
Review of Strategy Data Review of data gathered by Go PEO during implementation period	**Summative:** Aim is to measure the efficacy with which strategies were implemented.	Convenience sample of 10 elementary school educators

APPENDIX E – Research Questions by Community of Interest

Stakeholders	Types of Program Evaluation Research Questions
Researcher	**Summative** ● Will the students report an increased understanding of neurodiversity? ● Will the staff report an increased understanding of neurodiversity? ● Will the students have improved academic performance? ● Will the students have improved social performance? **Formative** ● Were the contents of the program enough for the school staff to increase efficacy with strategy implementation? ● Was the program structure and delivery sufficient for actual perspective changes in the students and school staff? ● What are other challenges for students with ADHD that were not addressed in the program?
School staff and students	**Summative** ● Will the students have improved academic performance? ● Will the students have improved social performance? ● Will the staff increase ease with effectively implementing evidence-based strategies? **Formative** ● Will the students and staff have a better understanding of their own strengths and strategies after participating in the program? ● Is the structure of the program conducive to meet the program's goals? ● What are other challenges for students with ADHD that were not addressed in the program? ● Were the elements of the program manageable for school staff to use during the school day? ● What were the best elements of the intervention structure that should be maintained in further developing the intervention (i.e.: adding a section about autism)?
Families of students	**Summative** ● Will the students have improved academic performance? ● Will the students have improved social performance? **Formative** ● Were the duration and pace of the program adequate? ● What elements of the program can be implemented in the home setting?
School Board	**Summative** ● Will the students have improved academic performance? ● Will the students have improved social performance? ● Has the intervention resulted in financial gains for the school? ● How has the intervention impacted student test scores? **Formative** ● Were the elements of the program manageable for school staff to use during school day?

APPENDIX F – Dissemination Budget

Item	Justification	Cost
Printing and Mailings	One primary audience will be reached in step two of the dissemination plan through mailings. Pending progress towards the goal, this step may be repeated once within the 5-year goal period.	$20
Website Domain Name	Electronic media, via a website, will be utilized in the plan to disseminate findings to both the primary and secondary audiences. The domain name will be renewed yearly for 5 years.	$50
NEA Membership	NEA partnership is part of the dissemination plan, with NEA as a messenger to both the primary and secondary audiences. Maintaining positive membership status will be important for maintaining a positive partnership between project lead and NEA.	$1000
Travel to Conferences	The final step of dissemination towards the secondary audience involves traveling for person-to-person contact at conferences and professional development events. This is to occur 1–2 times during the five-year period of the long-term goal.	$1000
Conference Registration	The final step of dissemination towards the secondary audience involves exhibiting at conferences to allow for person-to-person contact. This is to occur 1–2 times during the five-year period of the long -term goal.	$1000
Total		**$3070**

APPENDIX G – Available Local Resources

Category	In-Kind Resources
Consultants	The following consultants are available on a volunteer basis for a time commitment of 10 hours or less each. To ensure sustainability of services, paid consultation will be sought out, with these volunteers or other professionals. ● Friends and coworkers who work in web and app design and are willing to answer questions on the topic. ● Teachers and administrators who volunteer to provide feedback on the initial app. ● Students with ADHD who volunteer to provide feedback on the initial app. ● Boston University classmates who volunteer to provide feedback on the initial app.
Instruction	● YouTube Videos that come with selected free app design programs. ● Boston University librarian who provides guidance on accessing research. This is included in doctoral program tuition and fees that the app creator is already paying.
Equipment	● Free app development tool: AppMySite, PhoneGap, Alpha Anywhere Community are available if paid app design is not fundable.
Supplies	● OT4ADHD Facebook page and website, CHADD, and Understood.org which provide online resources for school accommodations for students with ADHD. ● Online databases through Boston University.
Communication	● Google suite
Materials preparation	● Entry-level occupational therapy, psychology, or education student to complete literature review and categorization of supports, linking possible solutions.
Evaluation	● SurveyMonkey free version
Other expenses	● Organizations (Boston University and Michigan OT Association – MiOTA) and personal friends and colleagues willing to promote Go PEO via personal social media. ● Facebook account can be made to promote app.

APPENDIX H – Cost Resources

Category	Resources	Cost 1-year (Design Phase)	Cost 2-year (Maintenance and Marketing Phase)
App Development	Design Phase: App Software and Designer Maintenance and Marketing Phase: App Designer Consultation	$40,000	$1,000
Consultants	Design Phase: ADHD consultant $20/hour for an estimated 40 hours total Maintenance and Marketing Phase: ADHD Consultant 5 hours at $20/hour	$800	$100
Equipment	Design Phase: Wi-fi costs $50/month Maintenance and Marketing Phase: Wi-fi costs $50/month	$600	$600
Travel	Design Phase: No Travel Maintenance and Marketing Phase: Travel to state and local occupational therapy and ADHD conferences to promote and collaborate on app. To include airfare, housing, and conference registration.	$0	$2,000
Dissemination Costs	Design Phase: National Education Association (NEA) Membership and Domain Name Maintenance and Marketing Phase: Printing and Mailing, NEA Membership, Domain Name, Travel (listed in row above)	$1,050	$1,070
Subtotals		$42,450	$4,770
Total			$47,220

APPENDIX I – Go PEO App Contents

The content of Go PEO has been created but will require funding and collaboration to develop. Appendix A presents the content in the form of a Google Form and video titled "Go PEO Future Edition Video" to describe the features the author envisions for the app. The features include increased customization, work saving, and auto populating previously entered information. The proposed digital layout will include as many multi-select or drop-down options as possible, with as few open-ended questions as possible, to decrease the time needed to complete the input information. A balance of question types will be used to maintain a student-specific input that matches the unique student.

Additionally, the vision is that an algorithm that generates evidence-based, neurodiversity affirming, and student specific strategies based on the review of the literature in Chapter 3 and the information entered into the app by the user would be created. Since this level of design is beyond the author's scope, a mock algorithm was used in the video titled "Go PEO Example Video," which is a case study of two teachers, Ms. S and Mr. N using the Go PEO app to produce a plan to support a student, Jimmy. The interactive Google Form, "Go PEO Future Edition Video" and "Go PEO Example Video" are available at https://sites.google.com/bu.edu/gopeo/videos?authuser=0 and the QR code:

APPENDIX J – Wonderfully Wired Children's Book

"Wonderfully Wired" by Emily Scannell and Karen Jacobs, Illustrated by

Shannon Dennis, is an interactive children's book. In the story, cartoon brain characters

Priya, Lou and Jalen, each dance differently and use different strategies for success at

school. They speed hop, slow flow, and dynamic disco through the school day! Written

by occupational therapy practitioners, "Wonderfully Wired" promotes the idea that each

person's brain is wonderfully wired (Scannell & Jacobs, 2022).

This book was created as an additional resource, based on the evidence-based

literature outlined in Chapter 3, as a way to promote positive disability awareness. The

book's words and illustrations were reviewed by a variety of people, in an attempt to

honor a variety of perspectives, backgrounds, and abilities. More

information, including a link for purchase, is available at

wonderfullywired.net or the QR code on this page. Audiovisual

versions, text only versions, image description versions, and

coloring pages are available on the website as well.

Image

Black and white hand sketched versions of the book illustrations. The first image

is a cartoon brain doing the disco, with the left hand pointing up to, and right hand near

the hip. The second image is Jalen, Lou, and

Priya each doing their dance move, with a disco

ball shining in multiple directions, as confetti and

music notes fill the air.

APPENDIX K – Executive Summary

Executive Summary of Go PEO for Elementary School Teachers
Emily Scannell, MS, OTR/L

Introduction

This Executive Summary document will provide teachers with information on the

Go PEO application (app) that will soon be available to them for free use. The executive

summary is based on a greater report titled Enhancing Support for Elementary School

Students with Attention Deficit Hyperactivity Disorder: Exploring the Go PEO

Application as an Occupational Therapy Digital Intervention for Teachers, and is

intended to be a concise, teacher specific summary. Specifically, the document will cover

why the app exists, how the app works, and what are the anticipated outcomes. Lastly,

within a final summary section, a description of how to access the app will be provided.

The app is named and modeled after the Person, Environment, and Occupation

model (PEO) which is commonly used by occupational therapy practitioners, and

suggests that characteristics of the person, environment, and occupation (or task) all

interact to support or hinder student and teacher participation (Law et al., 1996). The

name of the app is pronounced "Go P.E.O.".

Why the App Exists

Elementary students with Attention Deficit Hyperactivity Disorder (ADHD) face

barriers to school success, and teachers face barriers in supporting those students (CDCa,

2022, Rigoni et al., 2020). Students with ADHD may have diverse ways of thinking,

processing, and expressing information that do not match the expectations of the

classroom, assignment, or test. Teachers have limited time, competing demands, and

lack of training on ADHD support (Gaastra et al., 2020; Flanigan & Climie, 2018;

Poznanski et al., 2021).

How the App Works

Go PEO is a proposed digital app that provides student-specific, neurodiversity affirming, and evidence-based supports and accommodations to improve the academic and social experience of elementary school students with ADHD. It is designed for teachers to use, to help generate specific strategies based on observed student behaviors. The Go PEO app will be accessible online at a website that is being developed, or via the App Store, by the name Go PEO. It will be accessible on a computer, phone, or tablet. It is a free app for any school educators or occupational therapy practitioners.

Although not yet developed, the plan is that once on the app, teachers start by entering information about a student and a school environment and task that is challenging for the student. Then Go PEO's algorithm would generate a list of accommodations to the instruction, environment, or the task that could assist in promoting the student's participation in that situation and that are evidence-based and neurodiversity affirming. The teacher, and team (student included when appropriate) would choose which strategies to use, which are then broken into user friendly data collection sheets and action item lists. The action items will be systematically assigned to involve the support team by giving each member a specific role and responsibility.

The process of using the app, starting with a problem, and concluding with a solution, will take 15 minutes or less with Go PEO. Entries to the app can be saved and revisited at any point in the entry process. For instance, a teacher could independently spend a few minutes starting an entry during their prep hour, and then reopen the entry during a team meeting later that day to collaboratively continue the entry. After the

standard two-to-four-week implementation period, the team will re-enter the app and enter the gathered data, at which point Go PEO will guide the next steps.

Anticipated Outcomes

It is anticipated that Go PEO will result in improved safety and participation in the social and academic activities of the school day for students with ADHD. Further, it is anticipated that teachers will be better able to support students with ADHD by navigating the barriers of time, training, and competing demands.

Final Summary

The following main points are made in the executive summary:

- There is a mismatch between the ADHD neurotype, and school environment and tasks, that make school challenging for students with ADHD.
- Teachers face barriers in supporting students with ADHD. Barriers include competing demands, time, and training.
- Go PEO is a proposed free, user-friendly, app for teachers to access and implement evidence-based and neurodiversity affirming school accommodations to support students with ADHD.
- Through the use of Go PEO, students with ADHD and their teachers will have improved safety and quality of participation in the school day.
- To access Go PEO once developed, go to the App Store, and download the "Go PEO" app, or access the website.

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APPENDIX L – Fact Sheet

BOSTON UNIVERSITY

Enhancing Support for Elementary School Students with Attention Deficit Hyperactivity Disorder: Exploring the Go PEO Application as an Occupational Therapy Digital Intervention for Teachers

Emily Scannell, MS, OTR/L

Screenshot of App

Why: Elementary students with ADHD face barriers to school success, and teachers face barriers in supporting those students (CDCa, 2022, Rigoni et al., 2020). Teachers have limited time, competing demands, and lack of training on ADHD support (Gaastra et al., 2020; Flanigan & Climie, 2018; Poznanski et al., 2021).

What: Go PEO will be an interactive app using the Person, Environment, and Occupation model (Law et al., 1996) to find just right, evidence-based and neurodiversity affirming support for elementary school students with ADHD. Go PEO was designed to make planning, implementing, and monitoring supports easier, so you can focus on being with your students!

Who: This is for any educator who wants to support students with ADHD. Use as an individual educator or a group of educators.

When: Use when a student is having a difficult time with a specific activity or place in school. Observe the specific situation that is challenging for the student and bring those observations to the app.

How: Follow these steps: Input observed information to app > Select which strategy (generated by app) to implement > Assign team members to action items (generated by app). Select a follow-up meeting date > Implement the strategy for two-four weeks, until follow-up meeting date >At follow-up meeting, insert data in app. Follow the app prompts for next steps.

Quick Read Summary

- There is a mismatch between the ADHD neurotype, and school environment and tasks that make school challenging for students with ADHD.
- Teachers face barriers in supporting students with ADHD. Barriers include competing demands, time, and training.
- Go PEO is a proposed free, user-friendly app for educators to access and implement evidence-based and neurodiversity affirming school strategies to support students with ADHD.
- Through the use of Go PEO, students with ADHD and their teachers will have improved safety and quality of participation in the school day.
- To access the current state of the project online, go to https://sites.google.com/bu.edu/gopeo/home?authuser=0

Want more information?

Scan the QR code for:

Video demonstrations of Go PEO

Interactive Go PEO form

Fact Sheet References

What is the current status of the app? We are currently looking to collaborate with an app or web developer to complete the development of Go PEO.

Please send inquiries to escan@bu.edu

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