# SUPPORTING TEACHERS WORKING WITH CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN THE INCLUSIVE CLASSROOM

by

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Submitted in partial fulfillment of the requirements
for the degree of Master of Arts in School Psychology

at

Mount Saint Vincent University
Halifax, Nova Scotia
December 2022

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ABSTRACT

Students with attention-deficit/hyperactivity disorder (ADHD) often present with behavioural, academic, and social difficulties in the school context. Teachers are often not adequately trained to address the varied needs of students with ADHD, which can result in impairment and a lack of support. The purpose of this implementation study was to assess an online intervention designed for use by classroom teachers of students with ADHD. Teachers were recruited from across Canada to participate. 151 teachers were enrolled in this study and as such were given access to the ADHD module of *Accessible Strategies Supporting Inclusion for Students by Teachers* (*ASSIST*) and asked to respond to a variety of questionnaires assessing effectiveness, implementation, satisfaction, and possible impacts of the COVID-19 pandemic. Data was collected using a mixed-methods approach. Descriptive statistics, computer-generated statistics, paired-sample t-tests, and content analyses were used to examine the data using the RE-AIM (reach, effectiveness, adoption, implementation, and maintenance) framework. Analysis showed that recruitment resulted in a diverse sample of teachers whose attitudes and beliefs about students with ADHD improved significantly after completing the program. Participants reported being highly satisfied with *ASSIST for ADHD* but that the COVID-19 pandemic imposed some barriers to the implementation of *ASSIST* strategies in their classrooms. The results of this study suggest that *ASSIST* has enormous potential to become an affordable and accessible way to provide teachers with evidence-based strategies for supporting students with ADHD in the inclusive classroom.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Dr. Penny Corkum, for her support, insight, and suggestions in this process. Thank you for allowing me to be involved in your research work. I would also like to extend my gratitude to Dr. Melissa McGonnell for her guidance and expertise that has not only contributed to this research but also to my educational experience. To Maggie and Kelsey, I cannot put into words how thankful I am for your friendship and constant reassurance. I would also like to thank the rest of my fellow school psychology graduate students; I will never forget our time together.

To Winnie, my unofficial emotional support dog, I could not have done it without you. Lastly, to my family, thank you for your trust and constant support from 5,430km away. None of this would be possible without you.

*"Wer nicht wagt, der nicht gewinnt."*

CHAPTER ONE

# LITERATURE REVIEW

## Introduction

The first chapter of this thesis serves as a broad review of topics and research related to attention-deficit/hyperactivity disorder (ADHD). Firstly, a review of ADHD, its diagnostic criteria and core symptoms is provided. Then, the developmental course of the disorder and the impact it has on individuals is discussed. Various evidence-based interventions are summarized and compared. Finally, the program *Accessible Strategies Supporting Inclusion for Students by Teachers* (*ASSIST*) is presented, an overview of implementation research is provided, and the current study is introduced.

## Attention-Deficit/Hyperactivity Disorder

Attention-deficit/hyperactivity disorder (ADHD) is a complex neurodevelopmental disorder that includes both neurocognitive and behavioural difficulties which frequently result in impairment in major life activities, such as education, social relations, and occupational functioning (Barkley, 2015; DuPaul & Jimerson, 2014). Prevalence rates for children and adolescents are estimated to be 8.6% across Canadian provinces (Espinet et al., 2022), meaning that in a classroom of 25 to 30 children, between two and three students may have ADHD. ADHD is characterized by developmentally inappropriate core symptoms of inattention, hyperactivity, and impulsivity (DuPaul & Jimerson, 2014). Associated characteristics include challenges in planning, organization, self-evaluation, and mood stability (American Psychiatric Association, 2022; DuPaul & Stoner, 2014). More specifically, ADHD is defined in the Diagnostic and Statistical Manual of Mental Disorders - Fifth Edition (DSM-5-TR) as a “persistent pattern of inattention and/or

hyperactivity/impulsivity that interferes with functioning or development, has symptoms presenting in two or more settings (e.g., at home and school), and negatively impacts directly on social, academic, or occupational functioning" (American Psychiatric Association, 2022, p. 69). Specific diagnostic criteria will be discussed in the next section. ADHD-related symptoms manifest in impairments in children's academic and behavioural functioning, as well as in their social interactions (DuPaul & Stoner, 2014). Individuals with ADHD also show executive deficits in several cognitive domains such as visuospatial and verbal working memory, inhibitory control, vigilance, planning and reward regulation (Sergeant, 2004). The primary cause of this disorder is thought to be a result of a complex set of genetic factors, however, nongenetic factors such as perinatal stress, premature birth, and maternal substance use during pregnancy have been hypothesized to play a role in the etiology of ADHD (Rapport et al., 2006; Schachar, 2009). These genetic and nongenetic factors influence brain structure as well as functioning over time and ultimately affect behaviour (Schachar, 2009). The following section will give a more detailed overview of the diagnostic criteria of ADHD and its symptomology.

***Diagnostic Criteria***

The DSM-5-TR defines three different presentations of ADHD: (1) Predominantly inattentive presentation (ADHD-I), which is defined by six or more of the nine symptoms of inattention which were present for at least six months; (2) Predominantly hyperactive/impulsive presentation (ADHD-HI), which is defined by six or more of the nine symptoms of hyperactivity-impulsivity, also present for at least six months; and (3) Combined presentation (ADHD-C), which is defined by six or more symptoms of inattention as well as six or more symptoms of hyperactivity-impulsivity, which have to be present for at least six months

(American Psychiatric Association, 2022). Further, to diagnose a child with ADHD, they must also meet the following criteria: (a) some behavioural symptoms must have been present prior to age 12; (b) symptoms must be present in two or more settings (e.g. home and school); (c) symptoms must affect and interfere with social, academic, or occupational functioning; and (d) the symptoms do not present exclusively during the course of schizophrenia or another psychotic disorder and are not better explained by another mental disorder such as mood disorder, anxiety disorder or personality disorder (American Psychiatric Association, 2022). Severity specifiers can be used to further determine the ADHD diagnosis (i.e., mild, moderate, or severe) based on the functional impairment caused by the symptoms (Barkley, 2015). For instance, a child that shows six symptoms of hyperactivity/impulsivity as well as six symptoms of inattention but experiences only minimal functional impairment in few settings might receive a mild severity rating (Barkley, 2015).

ADHD is considered to be a very difficult disorder to diagnose due to the normal variation of temperament in young children (Rapport et al., 2006). Specifically, hyperactivity is evident to some degree in most childhood disorders, which presents a unique challenge to clinicians (Rapport et al., 2006).

### *Core Symptoms of ADHD*

**Inattentive Symptoms**. The nine inattentive symptoms, described in the DSM-5-TR, are characterized by a child that is (a) often failing to pay close attention to details and making careless; (b) often having difficulty sustaining attention; (c) often seemingly not be listening when spoken to; (d) often failing to follow through on tasks and instructions; (e) often having difficulty organizing tasks and activities; (f) often avoiding/disliking tasks that require sustained mental effort; (g) often losing things necessary for tasks/activities; (h)

often being easily distracted; and (i) often being forgetful in daily activities (American Psychiatric Association, 2013). It is important to note that these inattentive symptoms are not due to defiance or a lack of comprehension (American Psychiatric Association, 2022). Young students with ADHD who have difficulty paying and sustaining attention will often find tasks that require a lot of mental effort very difficult (Harrison et al., 2020). This means that in the school context, students with ADHD might struggle with tasks such as comprehension during silent reading, translating information from a text read to a written response or verbal response, and staying engaged during independent work, as these types of tasks all require sustained mental effort (Harrison et al., 2020). It is important to note that each child may present somewhat differently as the areas that they have specific difficulties with may vary.

**Hyperactive/Impulsive Symptoms.** General hyperactivity is defined as a condition of being abnormally or extremely active (Alderson et al., 2012). The specific hyperactive/impulsive symptoms of ADHD are also noted to be developmentally inappropriate and functionally impairing (Rapport et al., 2006). The nine hyperactive/impulsive symptoms listed in the DSM-5-TR describe that a child might be: (a) often fidgeting with or tapping hands/feet and squirming in their seat; (b) often leaving their seat in situations when remaining seated is expected; (c) often running or climbing in situations where it is not appropriate; (d) often having difficulty engaging in quiet, leisurely activities; (e) often "on-the-go" or acting as if they are driven by a motor; (f) often talking excessively; (g) often blurting out answers; (h) often having difficulty waiting their turn; and (i) often interrupting or intruding on others (American Psychiatric Association, 2022). Thus, a hyperactive/impulsive child in class may be observed to be constantly moving,

including in situations when it is not appropriate, excessively fidgeting, tapping, or speaking (Barkley, 2015). The same child may also display behaviour characterized by little or no forethought, reflection, or consideration of the consequences of a given action (Barkley, 2015). Impulsive children are more likely to take risks without thinking first and therefore frequently get into trouble with authority figures in their lives (Alderson et al., 2012). Hyperactivity and impulsivity are combined in the DSM-5-TR as these symptoms typically occur together (Williams & Taylor, 2006).

### *ADHD Comorbidity*

ADHD has been identified as a clinically heterogeneous disorder due to its high rates of comorbidity with other childhood-onset disorders (Gnanavel et al., 2019). It has been estimated that approximately 60% to 100% of children with ADHD also exhibit one or more comorbid disorder which often continue all the way into adulthood (Gillberg et al., 2004). As mentioned in the previous section on diagnostic criteria, any clinician diagnosing ADHD must always consider a wide range of possible co-existing disorders. These typically include Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD), sleep disorders, depression and anxiety disorders, Bipolar Disorder (BPD), tic disorders including Tourette syndrome, Obsessive-Compulsive Disorder (OCD), Specific Learning Disorder (SLD), and Autism Spectrum Disorder (ASD; Barkley, 2015; Gillberg et al., 2004; Uchida et al., 2018). Gender differences in ADHD comorbidity have been observed in some research studies (Levy et al., 2005; Rucklidge, 2008) with males having higher rates of ODD and CD occurrence, while anxiety disorders and depression are more common among females with ADHD (Levy et al., 2005). In other words, males diagnosed with ADHD are more likely to

also exhibit externalizing disorders whereas females with ADHD are more likely to also present with internalizing disorders.

Furthermore, a vast amount of research is available that examines other related impacts ADHD has on individuals during later developmental stages (Charach et al., 2011; Edwards et al., 2001; Olazagasti et al., 2013). A comprehensive meta-analysis conducted by Charach et al. (2011) examined childhood ADHD as a risk factor for substance use-related disorders in adolescence and adulthood. It was found that ADHD is associated with alcohol and drug use disorders in adulthood and with nicotine use in adolescence (Charach et al., 2011), meaning that adults with ADHD are more likely to have substance use disorders. Increased risk-taking behaviours add another layer of difficulty for adults with ADHD. A study conducted in 2013 tested whether children with ADHD have elevated risk-taking, accidents, and medical illnesses in adulthood (Olazagasti et al., 2013). Their findings concluded that in adulthood, participants with ADHD had more frequent occurrences of risky driving, sexually transmitted diseases, head injury, and emergency department admissions but did not differ from a control group on other medical outcomes (Olazagasti et al., 2013).

### *Developmental Course of ADHD*

Historically, ADHD was conceptualized as a disorder that was limited to males during their middle childhood; however, it is now known to be a chronic condition which persists into adolescence and adulthood for both males and females (Willoughby, 2003).

**Preschool Years.** The average onset of ADHD symptoms is often during preschool years, around the ages of three to four years old (Willoughby, 2003). Poor concentration, high levels of activity, as well as impulsiveness are typical characteristics of most

preschool-aged children, making detection of ADHD difficult at this stage of development (Harpin, 2005). Nonetheless, some children with ADHD may still stand out from their peers due to their often unusual intensity of play and excessive motor restlessness (Alessandri, 1992; Dupaul et al., 2001). It is important to note that ADHD typically presents differently across developmental stages.

**Elementary School Years.** Once a child moves into the elementary age range of six to 12 years old, difficulties with hyperactive and impulsive behaviours are likely to continue and additional difficulties sustaining attention start to become more apparent (Willoughby, 2003). A child with ADHD is frequently described by their teachers as extremely active and to be standing out as their classmates begin to develop the skills and maturity that enable them to learn successfully in school (Harpin, 2005). While many teachers try their best to adapt the classroom to allow for a student with ADHD to succeed, more frequently the child experiences academic failure, rejection by peers, and low self-esteem despite their best efforts (Alderson et al., 2012; DuPaul et al., 2001; Froese-Germain et al., 2012). At this stage, comorbid problems such as specific learning difficulties may also begin to impact the child, making management of the disorder more difficult for those involved (Harpin, 2005). Additionally, difficulties with work completion and productivity, distraction, forgetfulness related to assigned tasks, lack of proper planning, poor organization of activities, trouble meeting deadlines and completing house chores as well as school assignments are all difficulties and behaviours that are associated with elementary school-aged students who have ADHD (Dawson & Guare, 2018; DuPaul et al., 2001). Comorbidities such as sleep disorders are common at this stage of development. In a review article (Corkum et al., 2011), the importance of assessment and treatment of sleep issues in children with ADHD

was highlighted because poor sleep can worsen symptoms in children predisposed to ADHD (Knight & Dimitriou, 2019). Other comorbid disorders such as mood disorders, ODD, and CD may also arise during this stage of life.

**Adolescents. A**lthough a reduction in overactivity may be observed when children with ADHD progress into adolescence, inattention, impulsiveness and inner restlessness remain major stressors in the life of students with ADHD and those caring for them (Barkley, 2015; Harpin, 2005). A study conducted in the United States found that adolescents with ADHD often report a distorted sense of self and a disruption of the normal development of self (Krueger & Kendall, 2001). The authors of this study conducted qualitative interviews with participants, all of whom had been diagnosed with ADHD for at least two years, and ranged in age from 10 to 13 years old (Krueger & Kendall, 2001). It was observed that adolescents often describe who they are in terms of their difficult ADHD symptoms, rather than conceptualizing an identity distinct from their disorder (Krueger & Kendall, 2001). It was reported that participants in the study did not understand the concept that ADHD is a disability and the cause of many of their difficulties (Krueger & Kendall, 2001). Instead, they developed an identity that incorporated various stigmatized beliefs and negative attributes of ADHD into how they perceived themselves and defended those negative traits as part of their core being (Krueger & Kendall, 2001). For example, one participant noted that "I have had pretty negative thoughts about myself since I was little, especially when people are nagging me about things I mess up I try to do things right but I cannot. I think it is the way I will always be" (Krueger & Kendall, 2001, p. 65).

Further, aggressive and antisocial behaviour may develop during adolescence adding to the impact of ADHD. A study by Edwards et al. (2001) examined teenagers with ADHD

and oppositional defiant disorder (ODD), which is characterized by a pattern of angry and irritable mood, defiant behaviour, and/or vindictiveness. In this study, teenagers with ADHD or ODD rated themselves as having more parent-teen conflict than the participants of the control group, suggesting that the symptoms of both disorders have a substantial contribution to family conflict (Edwards et al., 2001). While young individuals with ADHD are at risk of academic failure, dropping out of school, or partaking in criminal behaviour, driving also poses an additional risk during adolescence (DuPaul & Jimerson, 2014; Edwards et al., 2001; Fischer et al., 2007; Harpin, 2005). In a study conducted in Wisconsin, researchers evaluated driving performance and adverse driving outcomes in a sample of ADHD children followed to young adulthood compared to a control group (Fischer et al., 2007). While examining the likelihood that a participant had ever experienced any of a variety of adverse driving outcomes, it was found that a significantly greater percentage of the ADHD group had previously been involved in a hit-and-run collision, had been ticketed for reckless driving and/or for driving without a license, had experienced a licence suspension or revocation, or had driven illegally at one point (Fischer et al., 2007).

**Adulthood.** While studies following large samples of children with ADHD into adulthood are few in number, one longitudinal study conducted by Weiss et al. (1985) was able to retain over 50% of their original sample into adulthood and reported on the persistence of symptoms from childhood into adult age. After following participants for over 15 years, it was found that as many as 60% of children with ADHD symptoms continued to have difficulties in their adult life (Weiss et al., 1985). The impacts of ADHD during adulthood are commonly researched. Barkley (2014) reports that a third of adults with ADHD have dropped out of high school and only 5% completed university degrees

(Barkley, 2015). The severity of inattentive symptoms is reportedly a significant predictor of high school dropout (Pingault et al., 2011). Furthermore, ADHD is also associated with high rates of occupational underachievement, a higher likelihood of being dismissed from employment, dropping out of school, and having to try several different jobs before finding one at which they can succeed (Uchida et al., 2018; Weiss et al., 1985).

### *Impact of ADHD*

**ADHD in the Classroom.** Students with ADHD experience more obstacles on their path through education than the average student. Quantifying the degree to which ADHD adversely influences attention in the classroom is extremely important. This is due to the fact that inattention is often the initial activator for clinical referrals of students (Pelham, Jr. et al., 2005). Academically, children with ADHD are more likely to receive poorer grades and lower scores on standardized tests. They are four to five times more likely to receive special education services and also have increased use of school-based services such as tutoring, after-school programs, and special accommodations (Loe & Feldman, 2007).

There are inconsistent findings in the research literature regarding whether academic and educational characteristics of children with ADHD-I (predominantly inattentive presentation) are substantially different from characteristics of children with ADHD-C (combined presentation), however, one study found that children with ADHD-I were more likely to be rated below average or failing in school by their teachers compared to children with ADHD-C or ADHD-HI which is the predominantly hyperactive-impulsive subtype (Baumgaertel et al., 2005). On the other hand, children with ADHD-HI were more frequently associated with perceived behavioural problems by their teachers (Baumgaertel et al., 2005). Academic difficulties for children with ADHD begin early in life and symptoms

are commonly reported in children aged three to six years (Willoughby, 2003). Preschool children with ADHD are more likely to be behind in basic academic skills compared to their same-aged peers (Loe & Feldman, 2007).

Students with ADHD are more likely to have a significantly higher rate of absenteeism from school and are three times more likely to have to repeat a grade in elementary school according to a study by Barbaresi et al. (2007). Their study also found that the median reading achievement scores in grade six were significantly lower for ADHD participants compared to non-ADHD controls (Barbaresi et al., 2007). Students with ADHD have also been found to complete less homework correctly (DuPaul & Stoner, 2014). Given the less-than-favourable prognosis for children with ADHD, regardless of ADHD presentation, it is crucial that evidence-based interventions are implemented as early as possible, particularly during elementary years.

### *Interventions for ADHD*

**Evidence-Based Practice.** When individuals look for any kind of treatment or intervention there are a lot of choices and a lot of different claims about what works. Some may look for help from friends and families, others from news headlines or the internet, but for various professions including psychologists, it is important to use what we know is effective by using evidence-based practice (EBP). The phrase EBP indicates somewhat different meanings across different professional disciplines (Spring, 2007). However, in psychology and other medical areas, evidence-based practice is a process that involves "the conscientious, explicit, judicious use of current best evidence in making decisions about the care of individuals" (Straus et al., 2015, p. 347). To be able to decide if a treatment or intervention is evidence-based, the number of research studies available, as well as the

quality of those studies are considered, meaning research is critically appraised for its validity, power, and usefulness (Straus et al., 2015). Evidence-based interventions should have been tested in multiple research studies, and confidence in a treatment can only grow if studies are repeated and researchers across different settings find the same outcome (Spring, 2007). Without the use of EBP in psychology, the health and well-being of clients may be compromised. Evidence-based treatments for ADHD are designed to increase target behaviours (i.e., being able to focus thoughts, developing organizational skills, planning, and controlling impulses) across various domains such as social and academic areas (DuPaul & Stoner, 2014).

**Evidence-Based Interventions for ADHD.** As non-treated or insufficiently treated ADHD will negatively affect many long-term outcomes (e.g., academic achievement) of individuals, timely and adequate treatment is imperative (DuPaul & Jimerson, 2014). The primary evidence-based treatment approaches for ADHD are pharmacological, psychosocial, and combinations of both (DuPaul & Stoner, 2014). Current guidelines recommend individualized multimodal and multidisciplinary treatment approaches (Mechler et al., 2022). Further, the American Academy of Pediatrics published clinical practice guidelines for ADHD in 2019 in which they recommend the following approach: behavioural treatment alone should be the first step of treatment for preschool-aged children (ages 4-6); medication and behavioural treatment should ideally be used in combination to treat elementary-age children (ages 6-11); and lastly medication alongside a recommendation of behavioural treatment and evidence-based training interventions are ideal for the treatment of adolescents with ADHD (ages 12-19; Wolraich et al., 2019).

***Pharmacological Interventions.*** The main factor in deciding whether pharmacological treatment in school-aged children should be initiated is the severity of the child's symptoms (Mechler et al., 2022). General clinical guidelines recommend that those who have low and moderate severity of symptoms can, while those with severe symptoms should be offered pharmacological treatment (Mechler et al., 2022). Medications that are approved by the FDA are comprised of stimulants (amphetamines and methylphenidate) and non-stimulants (atomoxetine and extended-release clonidine and guanfacine; Mechler et al., 2022). These medications can help children manage their symptoms and assist in controlling unwanted behaviours in their everyday life. A review of stimulant drug treatment research found a significant impact of pharmacological treatment on core features of ADHD in children. Improvements were noted for task completion, disruptive behaviour, and sustained attention (Conners, 2002). It is important to note that non-adherence to medication is common among young people, especially adolescents. Individuals who start pharmacological treatment often stop or start medication again over several years or discontinue its use altogether (Charach & Fernandez, 2013). Explanations for poor medication adherence include patients expressing negative responses to the recommendation of medication as well as experiencing adverse effects from the medication (Charach & Fernandez, 2013). Common side effects of ADHD medication include a loss of appetite, trouble sleeping, headaches, stomach aches, and nausea (Toomey et al., 2012). This emphasizes the importance of offering and recommending additional evidence-based treatment and interventions.

***Psychosocial Interventions.*** In addition to pharmacological treatment, research recommends the implementation of various psychosocial methods to address the behavioural and social difficulties that arise in children with ADHD. Psychosocial interventions for

mental health disorders are interpersonal or informational activities, techniques, and strategies that intend to target various domains to improve the functioning and well-being of individuals (England et al., 2015). Psychosocial interventions for ADHD tend to focus on behaviour management and training interventions (Evans et al., 2018).

***Behavioural Parent Training.*** A successful treatment plan for a child with ADHD often begins with parents who are educated about their child's disorder. Behavioural Parent Training (BPT) is a treatment in which parents learn to interact with their children in ways that elicit desirable behaviours and discourage unwanted behaviours (Evans et al., 2018). BPT is built on the concept of operant conditioning and social learning theories (Fabiano et al., 2015; Pelham, Jr. et al., 2005). There are numerous BPT programs, all with similar underlying principles and goals, that are delivered in various ways (e.g., in-person or online; by licenced clinicians or paraprofessionals; delivered to just parents or parents and children). Some of the most common programs are *Triple-P*, *Incredible Years Parenting Program*, *STAR Parenting*, *Community Parent Education* (*COPE*), and *Systematic Training for Effective Parenting* (*STEP*; CHADD, 2017).

In a study conducted by Hahn-Markowitz et al. (2016), the efficacy of a parent-child intervention called Cog-Fun was examined. This program specifically is administered by licenced therapists, in which children (ages 7-10) learn the skills of inhibition, effort, monitoring, and planning, alongside their parents, in a playful manner (Hahn-Markowitz et al., 2016). Parents are encouraged to use the strategies that they learn in the context of daily activities with their children and provide positive reinforcement (Hahn-Markowitz et al., 2016). Results of the study showed significant interactions for all parent-rated outcome measures (i.e., ADHD symptoms, organizational skills, and quality of life) at the

posttreatment time point, suggesting positive impacts of the Cog-Fun BPT program on these areas (Hahn-Markowitz et al., 2016).

Parent training has been proven to be effective in treating a variety of behaviour problems in children (Barlow & Stewart-Brown, 2000), however, not all families benefit from parent training programs. In a meta-analysis by Reyno and McGrath (2005) the authors examined isolated child, parent, and family variables that predict the response to parent training for children with externalizing behaviour problems such as ADHD. They found that predictors such as low education/occupation, maternal psychopathology, and low family income predicted poorer responses to parent training. They also concluded that the success of parent training is often influenced by variables not directly involving the child, but rather their environment and family (Reyno & McGrath, 2006).

As mentioned, parent training has been shown to be effective for creating positive behaviour change, however, this is often limited to the home environment and benefits may not always generalize to the school setting (Corkum et al., 2005), showing the importance of a focus on evidence-based interventions for children in the school context.

***In-School Evidence-Based Interventions.*** First-line treatment methods such as pharmacological interventions and behavioural therapy can be effective in reducing ADHD core symptoms but seem limited in directly improving academic functioning (Barkley et al., 2000; Mechler et al., 2022). Effective school-based interventions however have been proven to be effective in terms of classroom behaviour and academic performance of students with ADHD (Daley & Birchwood, 2010; Evans et al., 2018; Gallagher et al., 2015). Moreover, a study conducted in Nova Scotia found that youth with ADHD reported that classroom-based

learning strategies were the most helpful of all interventions they received (Walker-Noack et al., 2013).

Since the move toward inclusive classrooms, which commits to ensuring high-quality, culturally and linguistically responsive, and equitable education for every student (Nova Scotia Department of Education and Early Childhood Development, 2020), interventions that can be led by teachers have become even more important. Applying evidence-based interventions in the classroom is a crucial reminder of this policy and educational goal, which is to provide an inclusive and effective learning environment for all children equally. General in-school interventions include positive reinforcement strategies, reward systems, negative reinforcement procedures (e.g., taking away a privilege in response to an undesirable behaviour), daily parent communication, providing extra time and breaking down tasks, as well as frequent feedback for the student (Rajwan et al., 2012). Overall, behavioural classroom management and organizational training are school-based intervention strategies shown to be effective for students with ADHD (Evans et al., 2018).

***Behavioural Classroom Management.*** Behavioural classroom management (BCM) is an in-school intervention for ADHD, implemented by teachers (Evans et al., 2018). This approach encourages a student's positive behaviour in the classroom through various interventions such as establishing classroom rules, implementing daily report cards and point systems, and providing group contingencies while discouraging their challenging behaviours (DuPaul & Jimerson, 2014; DuPaul & Stoner, 2014; Evans et al., 2018). Interventions that are led by teachers have been shown to influence student behaviour constructively and increase overall academic engagement among students with ADHD (Evans et al., 2018). Barkley et al. (2000) implemented a contingency management program

in a classroom setting for children identified as having ADHD and disruptive behaviours. Measures for classroom behaviour included ADHD symptoms rated by teachers, parent ratings of attention, parent rating of social skills, and daily productivity (Barkley et al., 2000). All measures revealed significant improvement compared to control conditions (Barkley et al., 2000). The in-class management was effective in reducing the perceived behavioural problems and social skills; however, it is important to note that most treatment effects were specific to the school environment and did not affect students' achievement skills (Barkley et al., 2000).

***Organizational Training.*** Organizational training is a range of behavioural interventions for students with ADHD that specifically target organizational skills deficits concerning their school materials (Gallagher et al., 2015). This type of intervention is especially helpful for children who struggle with aspects of associated characteristics of ADHD such as time management, organizational management, and planning (Gallagher et al., 2015). Organizational deficits tend to emerge in about third grade and often persist into later years, becoming a major contributor to poor educational outcomes, as well as a point of conflict with authority figures and family (Gallagher et al., 2015). Organizational training interventions utilize behavioural skill training procedures, focusing on a system of prompts, monitoring, praise and reward, as well as contingency management to work towards increased desired behaviours in this area (Gallagher et al., 2015). Langberg et al. (2008) analyzed the efficacy of an eight-week organizational skills intervention for children with ADHD. Students received coaching on improving their organization of materials (i.e., school bag, binder, and locker) and homework management (i.e., accurate homework, schedule managing, and test recording; Langberg et al., 2008). A contingency management

system was established for participants in which they were able to earn free time and points towards gift cards for improving their organization and homework management skills (Langberg et al., 2008). At post-intervention, it was found that the students made large gains and improvements in the organization of materials as well as their homework management (Langberg et al., 2008). A small but significant finding was also made in regard to participants' grade point average (GPA; baseline GPA = 2.37, postintervention GPA = 2.63; Langberg et al., 2008).

**Barriers to Implementation.** Despite the vast research evidence of their effectiveness, in-school interventions are often implemented infrequently or not as designed (DuPaul & Stoner, 2014). The reasons for this, however, have not been widely investigated yet. One of the few studies in this area by Dawson et al. (2022), explored some of the reasons in a recent study in which they interviewed teachers to better understand what barriers and facilitators to implementation are most prominent. The types of barriers and facilitators that emerged from interviews included teachers' beliefs about behavioural classroom interventions, as well as factors that may interfere or assist with the execution of interventions (Lawson et al., 2022). Common barriers were described as forgetting due to competing demands, feeling "stressed and frustrated, or burned out", while facilitators included having a strong student-teacher relationship, and having built the habit of using a specific intervention (Lawson et al., 2022). Other barriers reported by teachers are a lack of professional training, no access to resources, and the high demand of teaching large classes with various competing demands (DuPaul & Stoner, 2014; Lawson et al., 2022; Long et al., 2016). A study by Froese-Germain (2012) further examined Canadian teachers' professional development (PD) needs as they often lack the necessary preparation and skills to meet the

needs of students with ADHD and other emotional and behavioural disorders. Nearly 70% of participants reported that they had not received professional development in areas of knowledge acquisition or skills training to address student mental illness and disorders (Froese-Germain & Richard, 2012). Teachers that took part in this study indicated that they need to receive professional development in areas of recognizing and understanding mental health issues in children, training in classroom management, training in engaging and working effectively with families, and strategies for working with children with externalizing behaviour problems (Froese-Germain & Richard, 2012). This and other studies show that there are various barriers and facilitators to the implementation of teacher- and in-school interventions for students with ADHD, also demonstrating the need for further research in this area.

**Accessible Strategies Supporting Inclusion for Students by Teachers**

*ASSIST* (Accessible Strategies Supporting Inclusion for Students by Teachers; formerly known as *Teacher Help*) was developed by Dr. Penny Corkum and her team for over a decade to overcome intervention barriers by providing a time-flexible, online accessible program which was created with the needs of teachers, students, and classrooms in mind. Not only does the program focus on ADHD, but it also provides a self-directed way to learn and implement evidence-based strategies in the classroom to address behaviours associated with other neurodevelopmental disorders. Currently, there are three modules of *ASSIST*, one for ADHD, one for LD, and one for ASD. The focus for the purpose of this paper is placed on the ADHD module of *ASSIST*. *ASSIST for ADHD* provides teachers with knowledge about ADHD characteristics, etiology, interventions, and helps address any misconceptions or negative attitudes about ADHD. The program focuses on teacher-student-

parent collaboration, communication, and provides support to teachers with the goal to reduce their stress while making evidence-based interventions easy to understand and implement.

Each *ASSIST* module is made up of six sessions. During the first of six sessions of the ADHD module, teachers are provided with an overview of ADHD, and information about impact, diagnosis as well as etiology. The second session focuses on the ABCs (+F) framework for thinking about behaviour, which stands for antecedents, behaviour, consequences, plus function. The second session also provides guidelines for the first steps in developing an *ASSIST* support plan, and preparation for school-home communication. The third through fifth sessions intend to help teachers develop a support plan individualized to the needs of their classroom and teach about characteristics associated with ADHD that it is important to be aware of. The goal of the final session is to put in place a plan for moving forward, addressing comorbid disorders, and preparing for the time after the teacher has completed the *ASSIST* module (i.e., how to continue to implement what they have learned).

*ASSIST* has undergone several stages of testing and has proven to have a variety of notable strengths. According to Elik et al. (2015), implementing a program that is collaborative in nature, encourages open communication with children, supports teachers to engage in self-care, provides reassurance to help teachers feel less overwhelmed, and initiates frequent parent communication. By providing teachers with an online program, it also makes it time-flexible and accessible which are typical barriers of other programs that are not asynchronous. Barnett et al. (2012) tested the usability of the ADHD module of *ASSIST*, which was called *Teacher Help for ADHD* at the time. In this study, nineteen teachers

from Nova Scotia completed the module over a seven-week period. Their findings reflected that teachers' knowledge changed positively from pre- to post-intervention significantly. Similarly, teachers' attitudes related to perceived control in their classroom and competence in teaching changed positively as well. Furthermore, the effectiveness of the ADHD module has also previously been tested in 2013 (Corkum et al., 2019). In this study, 53 elementary classroom teachers along with their students with ADHD took part in a randomized controlled trial to test *ASSIST* (Corkum et al., 2019). This study found statistically significant and clinically relevant improvements in ratings of ADHD symptoms and impairment ratings for students in the intervention group, relative to the control group, at 6-week and 12-week assessment points (Corkum et al., 2019). Additionally, satisfaction ratings for the content of the intervention were all above 84% (Corkum et al., 2019).

**Implementation Research**

In today's education system, there are many interventions available that were designed to help address specific issues. Those that are worthy of attention generally have a solid empirical foundation and promising positive outcomes. However, even interventions and programs that are rooted in research sometimes yield poor results due to poor implementation, which is what implementation research aims to investigate. Implementation research is of great importance as it shines a light on the differences between what can be achieved in theory and what happens in practice. In implementation science, researchers study the components necessary to promote the successful adoption of evidence-based interventions and thereby increasing their effectiveness (Schillinger, 2010).

There are many frameworks, from a variety of different disciplines that provide structures to measure implementation. However, a recent review of 25 frameworks shows

that many frameworks share commonalities in their description of stages of implementation as well as their core components (Meyers et al., 2012). One example is the Behaviour Change Wheel which was developed based on findings from 19 preceding implementation theories that characterized and designed behaviour change interventions (Michie et al., 2011). The Behaviour Change Wheel describes key factors of change being opportunity, capability, and motivation and is suggested by the authors to be used as a framework to identify effective interventions (Michie et al., 2011). Another popular framework, due to its comprehensiveness and flexibility, is the Consolidated Framework for Implementation Research (CFIR). CFIR is a frequently used framework that presents a structure for conceptualizing and distinguishing between a wide spectrum of implementation effectiveness factors which range from implementation setting and context to more innate intervention characteristics (Damschroder et al., 2009). Specifically, the CFIR identifies constructs across five domains: intervention (e.g., evidence strength and quality); outer setting (e.g., patient needs and resources); inner setting (e.g., culture and leadership engagement); individual characteristics, and lastly the process (e.g., planning, evaluation, and reflection; Damschroder et al., 2009).

While all of these frameworks have significant strengths, the goal of the current study is to evaluate the implementation and effectiveness of the *ASSIST* program using the Reach, Effectiveness, Adoption, Implementation, Maintenance Framework (RE-AIM; Glasgow et al., 1999). This specific framework was chosen as it is health-focused, allows for flexibility, works across various contexts, and has been previously used within the school context. It also analyzes the continued implementation of an intervention, an aspect that the other frameworks (e.g., the Behaviour Change Wheel) were not designed to inspect.

The RE-AIM framework conceptualizes the impact of an intervention, like *ASSIST*, as a function of five factors, while comprehending the multileveled nature of the program and considering settings, goals and purpose (Glasgow et al., 1999). It thereby guides the development of intervention programs by examining implementation barriers and facilitators. Previously, RE-AIM has been successfully used in multi-level research in a variety of mental health domains, as well as community and school settings (Gaglio et al., 2013). Reach assesses the representation of individuals who are willing to participate in an intervention, while Effectiveness analyzes the impact of the intervention on outcomes. The dimension of Adoption focuses on initiation as well as the overall implementation of the intervention. Similarly, the Implementation aspect of the RE-AIM framework examines the extent to which the intervention was delivered as intended by its creators. Lastly, Maintenance focuses on the long-term effects of the intervention.

Given the importance of supporting teachers teaching in inclusive classrooms and overcoming implementation barriers for classroom-based interventions, the following chapter will assess the implementation of the ADHD module of *ASSIST* using the above-discussed RE-AIM framework.

# CHAPTER TWO

## SUPPORTING TEACHERS WORKING WITH STUDENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN THE INCLUSIVE CLASSROOM

Attention-Deficit/Hyperactivity Disorder (ADHD) is a complex neurodevelopmental disorder that includes both neurocognitive and behavioural difficulties which frequently result in impairment in major life areas, such as education, social relations, and occupational functioning (Barkley, 2015; DuPaul & Jimerson, 2014). Prevalence rates are estimated to be 7.2% worldwide (Thomas et al., 2015), meaning that in a classroom of 25 to 30 children, between two and three students may have ADHD (DuPaul & Jimerson, 2014; DuPaul & Stoner, 2014). Core characteristics of the disorder include inattention, hyperactivity, and impulsivity, while associated characteristics include challenges in the areas of planning, organization, self-evaluation, and mood stability (American Psychiatric Association, 2013; DuPaul & Stoner, 2014). Individuals with ADHD have been found to have poor friendships and other relationships (Barkley, 2015) and are more likely to engage in risky behaviours than their peers (Olazagasti et al., 2013). Academically, students with ADHD are more likely to receive poorer grades and lower scores on standardized tests, are four to five times more likely to receive special education services, and also have increased use of school-based services such as tutoring, after-school programs, and special accommodations (Loe & Feldman, 2007). Given the less-than-favourable prognosis for children with ADHD, it is crucial that evidence-based interventions are implemented across life settings as early as possible.

The primary evidence-based treatment approaches for ADHD involve pharmacological treatments, psychosocial treatments, and combinations of both approaches

(DuPaul & Stoner, 2014). Psychosocial interventions for mental health disorders are interpersonal or informational activities, techniques, and strategies that intend to target various domains to improve the functioning and well-being of individuals (England et al., 2015). Psychosocial interventions for ADHD tend to focus on behaviour management and training interventions (Evans et al., 2018). These first-line treatment methods have been shown to be effective in reducing ADHD core symptoms (Barkley, 2015; Mechler et al., 2022). In order to also directly improve academic functioning in students with ADHD, school-based interventions have been shown to be highly effective in terms of improving classroom behaviour and academic performance (Daley & Birchwood, 2010; Evans et al., 2018; Gallagher et al., 2015). Moreover, a study conducted in Nova Scotia found that youth with ADHD reported that classroom-based learning strategies were the most helpful of a variety of interventions they received (Walker-Noack et al., 2013).

Since the move towards inclusive classrooms across Canada, which commits to ensuring high-quality, culturally and linguistically responsive, and equitable education for every student (Nova Scotia Department of Education and Early Childhood Development, 2020), ways of educating teachers on effective interventions for ADHD and other neurodevelopmental disorders (NDD) are in high demand. General in-school interventions include positive reinforcement strategies, reward systems, negative reinforcement procedures, daily parent communication, providing extra time and breaking down tasks, as well as frequent feedback for the student (Rajwan et al., 2012). Although these strategies and interventions have been proven to be effective, there is a lack of training for teachers in this area (Rajwan et al., 2012). Overall, behavioural classroom management and

organizational training are school-based intervention strategies shown to be effective for students with ADHD (Evans et al., 2018).

Despite the vast research evidence demonstrating their effectiveness, in-school interventions are often used infrequently or not as designed (DuPaul & Stoner, 2014). The reasons for this, however, are not widely investigated. Some of the available research has found barriers such as negative beliefs about behavioural classroom interventions, a lack of professional training, no access to resources, and poor teacher-student relationships (DuPaul & Stoner, 2014; Lawson et al., 2022). Implementation research, like the current study, focuses on these types of barriers but also intends to shine a light on the difference between what can be achieved in theory and what happens in practice. In implementation science, researchers study the components necessary to promote the successful adoption of evidence-based interventions thereby increasing their effectiveness (Schillinger, 2010).

*ASSIST* (Accessible Strategies Supporting Inclusion for Students by Teachers; formerly known as *Teacher Help*) was developed by Dr. Penny Corkum and her team to overcome intervention barriers by providing a time-flexible, online accessible program which was created with the needs of teachers, students, and classrooms in mind. The original module of the *ASSIST* program was developed to support teachers in their work with students with ADHD, which is the focus of the current research. More recently, two additional modules have been developed including one focused on Autism Spectrum Disorder (ASD) and the other on Learning Disabilities (LD). This e-learning tool provides teachers with knowledge about characteristics, etiology, and interventions, and helps address any misconceptions or negative attitudes about the NDD which is the focus of the module. The program emphasizes teacher-student-parent collaboration, communication, and

provides support to teachers with the goal to reduce their stress while making evidence-based interventions easy to understand and implement.

Each *ASSIST* module is made up of six sessions. During the first sessions in the ADHD module, teachers are provided with an overview of the disorder, diagnosis, as etiology, and information about the impact of ADHD on the child. The second session focuses on the ABCs (+F) framework for thinking about behaviour, which stands for antecedents, behaviour, consequences, plus function. This session also provides guidelines for the first steps in developing an *ASSIST* support plan, and preparation for school-home communication. The third through fifth sessions intend to help teachers develop a support plan individualized to the needs of their classroom and teach them about characteristics associated with ADHD that are important to be aware of. The goal of the final session is to put in place a plan for moving forward, addressing comorbid disorders, and preparing for the time after the teacher has completed the *ASSIST* module (e.g., how to continuously implement what they have learned).

The usability of the ADHD module of *ASSIST*, which was originally called *Teacher Help for ADHD*, has previously been tested (Barnett et al., 2012). In this study, nineteen teachers from Nova Scotia completed the module over a seven-week period. The findings reflected that teachers' knowledge changed positively and significantly from pre- to post-intervention. Similarly, teachers' attitudes related to perceived control in their classroom and competence in teaching changed positively as well. The effectiveness of the ADHD module has also previously been tested (Corkum et al., 2019). In this study, 53 elementary classroom teachers along with their students with ADHD took part in a randomized controlled trial to test this program. This study found statistically significant and clinically relevant improvements in ratings of ADHD

symptoms and impairment ratings for students in the intervention group, relative to the control group, at 6-week and 12-week assessment points. Additionally, satisfaction ratings for the content of the intervention were all above 84% (Corkum et al., 2019). This research suggests that *ASSIST for ADHD* has enormous potential to become an affordable and accessible way to provide teachers across Canada with evidence-based strategies for supporting students with ADHD at school. Before this can be done, the implementation of *ASSIST for ADHD* also needs to be assessed, which is the focus of the current study.

In the current study, implementation success among teachers was assessed using the Reach, Effectiveness, Adoption, Implementation, Maintenance Framework (RE-AIM; Glasgow et al., 1999). This specific framework was chosen as it is health-focused, allows for flexibility, works across various contexts, and has previously been used within the school context. Further, RE-AIM has also been successfully used in research in a variety of mental health domains and community settings, making it ideal for the current study (Gaglio et al., 2013). The RE-AIM framework conceptualizes the impact of an intervention, like *ASSIST for ADHD*, as a function of five factors, while comprehending the multileveled nature of the program and considering settings, goals and purpose (Glasgow et al., 1999). Reach assesses the representation of individuals who are willing to participate in an intervention, while Effectiveness analyzes the impact of the intervention on outcomes. The dimension of Adoption focuses on initiation as well as the overall implementation of the intervention. Similarly, the Implementation aspect of the RE-AIM framework examines the extent to which the intervention was delivered as intended by its creators. Lastly, Maintenance focuses on the long-term effects of the intervention.

**Research Questions**

The current study has four overarching research questions:

(1) Is *ASSIST for ADHD* implemented by classroom teachers in the manner that it was designed to be?

(2) What is the clinical effectiveness of *ASSIST for ADHD?*

(3) What was teachers' overall satisfaction with the ADHD module of *ASSIST*? and

(4) How did the COVID-19 pandemic impact the effectiveness and implementation of *ASSIST*?

Research questions (1) and (2) will be answered using the previously discussed RE-AIM Framework (See Table 1 for the definitions of each component of RE-AIM). Each component of RE-AIM has its own research questions which are as follows:

- Reach: (1) How did the recruitment methods work to reach and engage potential participants? (2) Did the recruitment methods result in a diverse and representative sample of teachers?
- Effectiveness: (1) Are there positive impacts of the program on proximal factors including teachers' attitudes, beliefs, and evidence-based practice? (2) Are there positive impacts of the program on distal factors including teacher distress and well-being? (3) Were there any negative impacts of the program?
- Adoption: (1) What proportion of teachers utilized (logged onto *ASSIST for ADHD*) the intervention? (2) What was adherence to the program like?
- Implementation: (1) What was the extent to which teachers utilized the strategies within the program? (2) What facilitated and impeded the implementation of the strategies presented in the module?

- Maintenance: (1) Do teachers report continuing to use strategies at the six-month follow-up?

## Method

### Participants

Canadian classroom teachers were recruited via various online methods, as well as traditional methods such as through the researchers' networks. Teachers were directed to the *ASSIST* registration website (http://assistforteachers.ca/) and asked to review the study information to determine if they were eligible to participate. Those who self-assessed as meeting the inclusion criteria of living within Canada and teaching grades 1 through 12 in English in a regular mainstream classroom setting, were consented for the current study. Teachers were excluded if they were not comfortable completing *ASSIST for ADHD* in English, if they did not currently have a student with ADHD in their class, if they had already previously participated in an *ASSIST*-related study, or if they planned to take a leave of absence during the following school year. Teachers were given the choice to participate in one of the three *ASSIST* modules (ADHD, LD, or ASD). For the current study, only those teachers that choose the ADHD module are included as participants.

### Measures

All measures were delivered online via REDCap (*Research Electronic Data Capture*, n.d.), a secure web application for building and managing online surveys as well as databases. REDCap was developed by Vanderbilt University (Nashville, Tennessee) to capture data for clinical research and is Health Insurance Portability and Accountability Act (HIPAA) compliant. Refer to Table 2 for a detailed breakdown of research questions, measures, and which questions from each measure were used for analysis.

***Screening Questionnaire (Pre-Intervention).*** The Screening Questionnaire (Appendix A) was created by the research team to determine teacher eligibility for participation in the current study. If teachers did not meet the basic inclusion criteria, they were sent a thank you message and contact information for the *ASSIST* research coordinator in case they wanted to discuss their eligibility further.

***Participant Characteristic Questionnaire (Pre-Intervention).*** The Participant Characteristics Questionnaire (Appendix B) is a 16-item self-report measure designed by the research team (Corkum, 2021) to gather general information about teachers who participated in the current study. This measure was administered at the pre-intervention stage and included questions regarding participants' age, sex, ethnicity, highest degree obtained, school community characteristics, and teaching career information (e.g., current grades being taught, length of teaching career). Several items were used in the current study to describe the demographic characteristics of the teacher participants who planned to use the *ASSIST for ADHD* module. Other portions of this questionnaire were selected for the current study to assess the Reach component of the RE-AIM framework.

***Teacher Attitudes and Beliefs Questionnaire (Pre- and Post-Intervention).*** An adapted version of the Teacher Attitudes and Beliefs Questionnaire (Kos, 2008) was used to assess teachers' beliefs, knowledge, and attitudes regarding children with Attention-Deficit/ Hyperactivity Disorder (Appendix C). This questionnaire gathered quantitative information about teachers' attitudes towards ADHD on four different factors including lack of control (e.g., "Students with ADHD could control their behaviour if they really wanted to"), negative classroom effects ("Other students do not learn as well as they should when there is a student with ADHD in the classroom"), diagnostic legitimacy (e.g., "ADHD is a valid diagnosis"), and

perceived competence (e.g., “I have the skills to deal with students with ADHD in my class”). Each question was rated at pre-and post-intervention on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A total score for the questionnaire and the corresponding factors were analyzed to examine the Effectiveness component of RE-AIM. The overall total maximum score for this questionnaire was 90 (total max score for lack of control: 30; total max score for negative classroom effects: 25; total max score for diagnostic legitimacy: 20; total max score for perceived competence 15).

***Instructional and Behaviour Management Approaches Survey (IBMAS; Pre- and Post-Intervention; Martinussen et al., 2011).*** This questionnaire (Appendix D) was given to teachers to collect quantitative data on how frequently teachers used specific instructional adaptations, instructional strategies, and behavioural management approaches. Teachers were asked to report frequency of use of the various strategies over the past four weeks on a total of 36 items by using a five-point scale ranging from 1 (*rarely*) to 5 (*most of the time*). A total score from this questionnaire at pre-and post-intervention was derived and used to analyze the Effectiveness (proximal) component of RE-AIM. Scores between 36 and 180 were possible for this questionnaire.

***Distress Thermometer (Pre- and Post- Intervention).*** This questionnaire (Appendix E) was adapted from the National Comprehensive Cancer Network (2019) and Ownby (2019). The questionnaire measures the self-reported level of distress an instructor is experiencing related to their teaching role. Following the self-rating, participants were asked about the influence of the COVID-19 pandemic on their rating. Teachers were able to select from a ten-point scale, ranging from 0 (*no distress*) to 10 (*extreme distress*), as well as further explain their rating in an open text

box. Items from the Distress Thermometer were used to analyze the Effectiveness component of RE-AIM.

***Subjective Well-Being – Teacher (Pre- and Post-Intervention).*** This questionnaire (Appendix F) was adapted from the Statistics Canada General Social Survey (Statistics Canada, 2016) and used to measure teachers' perceived level of satisfaction in their current teaching role. On a ten-item scale, ranging from 1 (*dissatisfied*) to 10 (*very satisfied*), participants were asked to rate their satisfaction. If they self-reported feeling dissatisfied, they were asked to rate how much of their dissatisfaction was a result of the COVID-19 pandemic. The items on this measure were used to assess the Effectiveness component of RE-AIM.

***Implementation Questionnaire (Post-Intervention).*** This questionnaire (Appendix H) was developed by Dr. Corkum and research team for the current study, examines the facilitators/barriers to implementation of given strategies, and was provided to participants who completed at least one session of the ADHD module. Teachers were asked to specify strategies that they had adopted from the program (if any) and how frequently they implement them in their classroom. To do so, participants were given a selection of responses to choose from to answer if they were currently using strategies and how often, as well as open-text boxes to allow elaboration on their answers. Items from this questionnaire were used to assess the Effectiveness, Adoption, Implementation, and Maintenance components of RE-AIM.

***Computer-generated user statistics.*** Computer-generated user statistics provided data on the total number of access codes distributed, which measured Reach. Computer-generated statistics also provided data on enrollment to *ASSIST for ADHD,* and the number of sessions completed which measured the Adoption component of RE-AIM.

***6-Month Follow-Up Questionnaire (Post-Intervention).*** This questionnaire (Appendix I) was developed by the research team to assess participants' continued usage of the strategies from each *ASSIST* module. Teachers were asked to fill out this questionnaire six months after they first received access to their chosen *ASSIST* module. Qualitative and quantitative items on this questionnaire were used to assess the Maintenance component of RE-AIM.

***Teacher Satisfaction Questionnaire (Post-Intervention).*** This questionnaire (Appendix G) was developed by Dr. Corkum (2021) for previous research and modified for the current study. The 19-item questionnaire assesses teachers' overall satisfaction with *ASSIST*. Both qualitative (i.e., open text boxes) and quantitative items (i.e., Likert scales) are included. Twelve rating items (1 = strongly disagree to 6 = not applicable) were summed to derive a total score. Scores between 13 and 65 were possible for this questionnaire. One question asking whether teachers would recommend this program was also analyzed. Teachers were given the choice to either choose Yes or No to answer this question. Included items from this questionnaire were used to answer the third overarching research question: What was teachers' overall satisfaction with the ADHD module for *ASSIST*?

***COVID-19 Impact & Status Update Questionnaire (Post-Intervention).*** This questionnaire (Appendix J) was developed by Dr. Corkum in 2021. The 9-item questionnaire asks participants about the impact of partaking in the *ASSIST* program during the global COVID-19 pandemic. The questionnaire is made up of quantitative items only (i.e., percentage ranges, Likert scales), which ask about any changes to participants' teaching locations, the percentage of time spent teaching online, and how much the pandemic affected their teaching. These items were used to answer the fourth overarching research question: How did the COVID-19 pandemic impact the effectiveness and implementation of *ASSIST?*

**Procedure**

The current research was funded by Kids Brain Health Network and received ethical clearance from the IWK Health Centre Research Ethics Board in Halifax, Nova Scotia. For the purpose of the current study, further ethical clearance was also received from Mount Saint Vincent University. Participant recruitment was conducted through various channels including social media, search engines, emails, and the social network of the researcher. Recruitment on social media sites included Facebook (https://www.facebook.com/ASSISTforteachers/) and LinkedIn (https://www.linkedin.com/company/assistforteachers), Google ads were also placed online. All advertisements were published with a link to the *ASSIST* homepage website (www.assistforteachers.ca). If teachers were interested in participating, they were directed to a link that led them to the REDCap electronic database in which they completed the Screening Questionnaire to determine eligibility, and if they met study criteria, they were directed to the Teacher Consent Form (Appendix K) to review and sign electronically. Participants did not choose their specific NDD module until this step was completed.

Once eligibility was confirmed and consent was provided, participants received an email containing an invitation to complete pre-intervention questionnaires via REDCap. After completing the pre-intervention questionnaires, participants received further email correspondence containing their personal login information for *ASSIST.* They were then able to start their chosen *ASSIST* module which included six sessions, each estimated to take approximately an hour to complete. After each session, there was a mandatory one-week delay until the next session was made available to participants. For the ADHD module, information was provided using text, video, and activities in a self-guided manner. *ASSIST* is designed to be completed over the course of six to eight weeks which gives teachers one to two weeks to

implement some of the strategies that they learned in each session and familiarize themselves with the material. If at least one session was fully completed, the participant received an email prompting them to complete the post-intervention questionnaires. All participants were entered into a draw for a chance to win one of three Amazon gift cards valued at either $100, $75, or $50 as compensation for their time and effort.

**Analysis**

***Quantitative Analysis.*** All quantitative data were analyzed using IBM's Statistical Package for the Social Sciences software (*SPSS*, n.d.). Data from questionnaires that were given at pre- and post-intervention time points were tested for normality and compared using paired samples t-tests. Prior to running any paired samples t-test, a Shapiro-Wilks test of normality was conducted to ensure that all data was normally distributed without significant outliers. If there was evidence of non-normality within the data, a Wilcoxon Signed Rank test was completed, which is considered the non-parametric equivalent to a paired samples t-test. All other data was analyzed by running descriptive statistics within SPSS.

***Qualitative Analysis.*** Qualitative data were analyzed using content analysis procedures suggested by Hsieh and Shannon (2005), which included six stages: (1) familiarization with the data and its contents; (2) generation of initial codes; (3) search for common themes; (4) review of discovered themes; (5) naming and defining themes; and (6) production of results. Once the data was analyzed through these stages, it became apparent that the majority of responses provided by participants were too concise to be appropriately encapsulated through a process that aims to quantify and summarize the responses with codes. Therefore, adaptions were made to the content analysis procedures of Hsieh and Shannon (2005) that were reduced to four stages: (1)

familiarization with the data and its contents; (2) search for common themes; (3) review of discovered themes; and (4) creation of qualitative summaries that encapsulated themes.

## Results

### Research Question 1: Is *ASSIST for ADHD* implemented by classroom teachers in the manner it was designed to be?

#### *1.Reach*

**How did recruitment methods work to engage potential participants?** Recruitment for the current study was completed between March 1, 2021 and April 27, 2021. Post-intervention data was collected in July 2021 and follow-up data was gathered throughout January and February 2022. During the recruitment period, a total of 1371 people visited the *ASSIST* website, 341 of whom consented to participate in the ASSIST implementation study. Across all modules, 273 people completed pre-intervention questionnaires to determine their eligibility, which led to 261 *ASSIST* accounts being opened. Of those who consented, 151 were interested in participating in the ADHD module. Given the multi-step nature of the current study, some gradual participant attrition was observed throughout this study. Refer to Figure 1 for a detailed overview of participation at pre-, post-intervention, and follow-up time points.

Various methods were used to recruit teachers for the current study. Of participants who were interested in the ADHD module of *ASSIST*, 62.3% ($N = 94$) reported being recruited via word-of-mouth methods (i.e., via email, through their profession, through a community organization, or through their respective school board), making it the most popular and successful recruitment method. Further, 32.5% ($N = 49$) reported finding out about *ASSIST* via social media (i.e., Facebook, Instagram, LinkedIn, YouTube. Finally, 4.6% ($N = 7$) found

*ASSIST* through website advertisements. None reported being recruited via print methods (i.e., via newspaper ads).

**Did recruitment methods result in a diverse and representative sample of participants?** The goal to recruit 100 Canadian teachers for this study was surpassed as a total of 151 participants, ages 23 to 65 ($M = 41.19$, $SD = 9.28$), expressed interest in *ASSIST for ADHD* and met eligibility criteria. Of the 151 participants, 13 (8.6%) identified as male while the majority, 124 (82.1%), identified as female and 14 (9.3%) did not disclose their sex. The ethnicity of teachers included 110 (72.8%) white, 1 (0.7%) black, 4 (2.6%) aboriginal, 1 (0.7%) South Asian, 7 (4.6%) Chinese, 1 (0.7%) Filipino, 2 (1.3%) Arab, 2 (1.3%) Korean, 3 (2%) other (i.e., Portuguese, mixed), 6 (4%) preferred not to respond, and 14 (9.3 %) did not fill out this section of the demographic questionnaire. Further, participants were asked to report where they are residing in Canada. Out of all participating teachers, 11 (7.3%) were from Alberta, 34 (22.5%) from British Colombia, 7 (4.6%) from Manitoba, 2 (1.3%) from New Brunswick, 5 (3.3%) from Newfoundland, 1 (0.7%) from the Northwest Territories, 41 (27.2%) from Nova Scotia, 2 (1.3%) from Nunavut, 25 (16.6%) from Ontario, 16 (10.6%) from Prince Edward Island, 3 (2%) from Quebec, and 4 (2.6%) from Saskatchewan. Out of those participants, 35 (23.2%) reported teaching in a rural area of their province/territory, 34 (22.5%) taught in a town, 38 (25.2%) taught in a city with a population under 500,000, 30 (19.9%) reported teaching in a city with more than 500,000 residents, and 14 (9.3%) did not fill out this section of the demographic questionnaire.

Teachers had experience in their profession between 1 and 30 years ($M = 13.21$, SD = 7.98). Of the participants 72 (48%) reported having a bachelor's or equivalent degree, 44 (29.1%) had a master's degree, 11 (7.3%) had a doctorate in education, and 9 (6%) selected other

(i.e., Ph.D., Early Childhood Education Certificate, or still completing their degree). Finally, teachers reported teaching grades 1 through 12 at the time of participation. Of those, 16 teachers taught grade one (11.7%), 21 (15.3%) taught grade two, 10 (7.3%) taught grade three, 16 (11.7%) taught grade four, 8 (5.8%) taught grade five, 18 (13.1%) taught grade six, 7 (5.1%) taught grade seven, 6 (4.4%) taught grade eight, 6 (4.4%) taught grade nine, 7 (5.1%) taught grade 10, 1 (0.7%) taught grade 11, and 1 (0.7%) taught grade 12. Twenty (14.6%) selected other. Of those who selected other, 11 (8%) teachers specified that they are currently teaching across grades (i.e., multiple grades throughout the year) and 3 (2.2%) are resource/special education teachers.

***2. Adoption***

**What Proportion of Teachers Utilized the Program (i.e., logged onto *ASSIST*)?** Descriptive statistics were run to analyze the number of participants who enrolled in the ADHD module. Of the 151 teachers who consented to participate in the study, 103 (68.2%) enrolled in *ASSIST for ADHD*.

**What was the Adherence Like to the Program?** Descriptive statistics were run to analyze the number of sessions completed by participants. This showed that of the 103 participants who enrolled, 42.7% ($N = 44$) did not complete any sessions, 15.5% ($N = 16$) stopped after completing one full session, 13.6% ($N = 14$) completed two full sessions before discontinuing, 4.9% ($N = 5$) stopped after three sessions, 4.9% ($N = 5$) discontinued after completing four sessions, 2.9% ($N = 3$) completed five sessions before discontinuing, and 15.5% ($N= 16$) of participants enrolled completed all six sessions and did not discontinue before completing the entire module.

### *3. Implementation*

**What was the extent to which teachers utilized the strategies within the program?**

Fifty-one participants answered items asking about carefully they reviewed the *ASSIST* module content, what percentage of strategies they tried to implement, and how successful they were at following session plans. Participants provided an average response of 3.9 (*SD* = 1.1) on a scale from 1 (*not careful at all*) to 5 (*very careful*), indicating careful review of sessions. Furthermore, according to participants, approximately 46% pf the strategies that they learned during the ADHD module were attempted to be implemented (*M* = 45.69, *SD* = 26.91). Lastly, participants were asked to rate how successful they were at following the *ASSIST* session plans. On a scale from 1 (*not at all successful*) to 7 (*very successful*), the average response was 3.27 (*SD* = 1.51), indicating that teachers felt neither successful nor unsuccessful in following the session plans.

Additional items were given to assess the current use of *ASSIST* strategies. Firstly, participants were asked if they were currently (after completing *ASSIST*) using any of the strategies that they had learned in the ADHD module of *ASSIST*. Forty-four participants answered this question, 20.5% (*N* = 9) of which said that they were using most of the strategies they learned, 31.8% (*N* = 14) said they were using some of the strategies, 18.2% (*N* = 8) were using a few of the strategies, 20.5% (*N* = 9) reported not using any of the strategies, and 9.1% (*N* = 4) selected not applicable. Secondly, 31 participants responded to a question asking how often they still use strategies from the *ASSIST for ADHD* module. Out of those, 35.5% (*N* = 11) said they always (i.e., every day) use strategies that they learned, 25.8% (*N* = 8) said they often (i.e., 4 days per week) use strategies, 35.5% (*N* = 11) said they sometimes (i.e., 2 or 3 days per week) use strategies, and 3.2% (*N* = 1) responded that they rarely (i.e., 1 day per week) still use strategies that they learned. No participants chose not at all (i.e., 0 days per week).

**What facilitated and impeded the implementation of the strategies presented in the module?** To answer this question, qualitative data was taken from three open textbox questions. A total of 40 participants provided answers to the three questions.

Firstly, participants were asked what made the *ASSIST* program easy to use in their opinion. Overall, they complimented the program's flexibility, its breakdown into key steps, asynchronous delivery, and the ability to "go back to different stages and re-read information". Some participants also stated what makes the program easy to use are the "easy instructions to implement and excellent examples to follow". Another participant complimented that the "training is straightforward and written so any teacher could understand". Other positive comments were made regarding the usefulness of the module's videos, webinars, and summary pages. Lastly, participants noted that the program was "easy to navigate and pleasing to look at", they also enjoyed that "everything is in one place".

Participants were then asked to provide comments regarding factors that impeded the implementation of *ASSIST for ADHD*. Several teachers noted that rather than aspects of the program itself, it was the "lack of time as a teacher" and "time constraints" that impeded their implementation of *ASSIST*. Some participants also referred to COVID-19 as a barrier to implementation. One participant specifically noted that the "timing of the pandemic and the requirement to retool courses to be completed online" added immensely to their workload and took away time that could have been spent focusing on *ASSIST*. Further, some participants mentioned that they disliked the one-week mandatory wait between modules and that they would have preferred to be able to access all sessions at once.

The third question asked participants if they could think of any changes to the program that would help them stay more involved throughout the entirety of the *ASSIST for ADHD*

module. The majority of participants stated that there were no changes that they could think of or that the question did not apply to them. Some teachers suggested that collaboration with other teachers or "small group discussions" would have been beneficial, while others would like to see "longer session times in total".

***4. Maintenance***

**Do teachers report continuing to use the strategies at 6-months post-intervention?**

To examine the continued use of intervention strategies after completing the ADHD module, participants were asked to fill out a questionnaire 6-months post-intervention. The items asked about the current use of strategies as well as the likelihood of continued use in the future. Thirty-one participants completed a question asking whether they still used any of the strategies provided in *ASSIST*. Out of those, 8 (25.8%) reported still using most of the strategies, 10 (32.3%) still using some of the strategies, 5 (16.1%) reported still using a few, and 8 (25.8%) stated that they were not using any of the strategies 6-months after completing *ASSIST*. Another question asked participants to report how often they still use the strategies learned during the ADHD module. Of the 23 participants who answered this question, 17 (73.9%) participants reported using the strategies four to five times per week. Further, 3 (13%) reported using strategies approximately two or three times per week, while 3 (13%) stated that they only use the strategies one day per week. None of the participants reported never using the strategies. Lastly, participants were asked to report on the likelihood that they will continue to use strategies from the ADHD module in the future with other students. This question was answered by 23 participants. 14 (60.9%) participants stated that it was highly likely, 7 (30.4%) reported likely, and 2 (8.7%) stated that it was somewhat likely. None of the participants selected "not likely" as their answer.

Participants were also asked to indicate which parts of *ASSIST* f*or ADHD* they were continuing to use. Few elaborated on specifics, but general comments such as "teaching students with ADHD strategies", "multiple methods showing of understanding", "visual schedules", and "classroom strategies" were most often made.

**Research Question 2: What is the clinical effectiveness of *ASSIST for ADHD*?**

***5. Effectiveness***

**What were the positive impacts of the program on proximal factors?** Fifty-one participants completed items used for this analysis. A significant difference in teachers' attitudes and beliefs at pre- ($M = 43.02$, $SD = 5.41$) and post-intervention ($M = 37.24$, $SD = 6.64$) was found, $t(50) = 6.65$, $p < 0.001$, with a large effect size ($d = 0.93$). These results suggest that the *ASSIST for ADHD* module positively impacted teachers' attitudes and beliefs. Lower scores reflect disagreement on negative statements regarding beliefs about students with ADHD, their lack of control, negative classroom effects, diagnostic legitimacy, and perceived competence of students with ADHD. In other words, lower scores reflect positive beliefs about students with ADHD.

When taking a closer look at the factors contributing to teachers' attitudes and beliefs, results show that scores on the perceived lack of control among students with ADHD were significantly higher at post-intervention ($M = 11.78$, $SD = 2.48$) compared to pre-intervention ($M = 9.73$, $SD = 2.55$), $t\ (50) = -5.79$, $p < 0.001$, $d = -0.81$. This means that at post-intervention, participants agreed more with negative statements about ADHD students' lack of control than they did before partaking in *ASSIST*. Scores on the factor of diagnostic legitimacy were significantly lower after completing *ASSIST* ($M = 6.47$, $SD = 1.90$) compared to pre-intervention ($M = 11.82$, $SD = 1.50$), $t\ (50) = 14.89$, $p < 0.001$, $d = 2.09$. This means that participants agreed

significantly less with negative statements regarding diagnostic legitimacy of ADHD after completing the *ASSIST for ADHD* module than before the program. In other words, teachers had more positive beliefs regarding ADHD being a legitimate diagnosis after completing *ASSIST*. Further, participants were asked to rate statements regarding their own competence in being able to deal with the needs of their students with ADHD. Analysis shows that teachers rated these statements significantly lower at post-intervention ($M = 7.37$, $SD = 2.06$) compared to pre-intervention ($M = 9.61$, $SD = 1.54$), $t\ (50) = 5.89$, $p < 0.001$. $d = 0.83$. These results show that participants agreed with negative statements regarding their own competence much less after completing the ADHD module of *ASSIST*. In other words, participants had more positive views regarding their own competence at post-intervention. Lastly, scores on the negative classroom effects factor were not different at post-intervention ($M = 11.61$, $SD = 3.54$) compared to the pre-intervention timepoint ($M = 11.86$, $SD = 3.59$); $t\ (50) = 0.55$, n.s., $d = 0.07$.

To further explore the possible positive impacts of *ASSIST* on proximal factors, a paired-samples *t*-test was also conducted on items which asked participants about their use of evidence-based strategies at pre-and post-intervention time points. Fifty-one participants completed the included items at both time points. A paired-samples *t*-test analysis showed significant differences between total scores from pre-intervention ($M = 125.43$, $SD = 18.96$) and post-intervention ($M = 131.34$, $SD = 16.81$), $t\ (50) = -2.67$, $p = 0.01$, $d = -0.37$. To further understand the results of the IBMAS, it is important to look at the two different subscales of this measure. While the behavioural strategies subscale showed no significant change from pre- ($M = 61.48$, $SD = 8.90$) to post-intervention ($M = 63.59$, $SD = 8.25$), *paired* $t\ (50) = -1.98$, n.s., $d = -0.28$, the academic strategies subscale shows significant higher scores at post-intervention ($M = 67.75$, $SD = 10.92$) compared to the pre-intervention time point ($M = 63.95$. $SD = 11.66$), $t\ (50) = -2.81$, $p =$

0.007, $d$ = -0.39. These results show that while teachers' usage of behavioural strategies may not have increased significantly after completing *ASSIST*, their use of academic evidence-based strategies did significantly increase in frequency after completing the ADHD module.

**What were the positive impacts on distal factors?** A paired samples *t*-test was conducted to investigate whether teachers self-reported distress levels before and after completing the ADHD module of *ASSIST*. Fifty-one participants completed items in which teachers were asked to rate the stress they had been experiencing in the past week on a scale from 1 to 10. Results show a significant increase in distress ratings from pre-intervention ($M$ = 5.06, $SD$ = 1.86) to post-intervention ($M$ = 5.94, $SD$ = 2.21), $t$ (50) = -2.85, $p$ = 0.006, $d$ = -0.40.

Another paired samples t-test was conducted to analyze whether there were changes in participants' satisfaction with their current teaching role. For this analysis, scores from items asking about participants' satisfaction with their role were compared at pre- and post-intervention time points. Fifty participants completed the items at both times. Results showed no significant change between pre- ($M$ = 6.53, $SD$ = 1.81) and post-intervention ($M$ = 6.37, $SD$ = 2.03), $t$ (50) = 0.57, n.s., $d$ = 0.08. This shows that there was no significant change in participants' satisfaction with their teaching role after completing the *ASSIST* ADHD module.

**Were there any negative impacts of the program?** A total of 29 qualitative responses were given by participants. The majority of teachers said that there were no negative effects. The only actual negative effect reported was that teachers were feeling bad when they could not finish the program for reasons out of their control. For instance, one participant said that "I felt badly that I could not access [the program] very well due to covid restrictions", suggesting that the program itself did not directly impact the participant negatively, but rather the pandemic

restrictions did. There were no mentions of any negative impacts on the students who were the focus of this program.

**Research Question 3: What was teachers' satisfaction with the ADHD module for *ASSIST*?**

Forty-seven participants completed items which asked teachers to indicate their level of agreement with various statements about the *ASSIST* program. Items were rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The highest score possible on this questionnaire was 65. The total average score was 54.88 ($SD$ = 5.89) suggesting a good rate (84%) of teacher satisfaction. Descriptive statistics revealed that on average, respondents agreed or strongly agreed with seven factors about the program. These factors were that the program was easy to understand ($M$ = 4.7, $SD$ = 0.62), adaptable ($M$ = 4.55, $SD$ = 0.8), accessible ($M$ = 4.55, $SD$ = 0.83), encouraged collaboration ($M$ = 4.45, $SD$ = 0.8), that the module took just the right amount of time to implement ($M$ = 4.09, $SD$ = 1.16), that the supplemental materials were useful ($M$ = 4.4, $SD$ = 0.83), and that they learned information that they can apply to other students in the future ($M$ = 4.64, $SD$ = 0.61). Only two factors fell within the 3 to 4 range (Neutral). These factors were about the usefulness of check-in questions at the beginning of sessions ($M$ = 3.87, $SD$ = 1.19) and about the ability of teachers to implement interventions suggested by *ASSIST for ADHD* ($M$ = 3.55, $SD$ = 1.26).

Part of this analysis was also a question asking participants whether they would recommend the program to other teachers, which received very positive answers as 46 out of 47 (98%) teachers said that they would. Refer to Table 4 for a detailed breakdown of all scores for this analysis.

**Research Question 4: How did the COVID-19 pandemic impact the effectiveness and implementation of *ASSIST*?**

Items used for this analysis were filled out by 51 participants. The first item asked teachers whether there have been any changes in their teaching location due to the COVID-19 pandemic since starting the *ASSIST for ADHD* program. The majority (58.8%) responded that their location has changed, while 41.2% said that there were no changes to their teaching location. Secondly, participants who said yes to the first question (i.e., that their teaching location had changed) were also asked to estimate the percentage of time that they were teaching online while completing the ADHD module. On average, teachers reported that 47.14% of their time was spent teaching online. When asked to rate the program's adaptability for online teaching from 0 (not at all) to 4 (a lot) the average response from participants was $M = 2.47$ ($SD = 1.14$). Finally, to better understand the influence of COVID-19, participants were also asked to rate how much the pandemic impacted their teaching since the time of starting the *ASSIST* program on a scale from 0 (Not at All) to 4 (A Lot). The average for this question was 3.84 ($SD = 1.01$).

## Discussion

The primary objective of this study was to evaluate the effectiveness, implementation, and satisfaction of Canadian classroom teachers with the *ASSIST for ADHD* program. This study was conducted by providing access to the module to teachers recruited across Canada and asking them to respond to questions targeting factors such as program effectiveness, their attitudes and beliefs regarding ADHD, implementation of *ASSIST* strategies, overall satisfaction, and their willingness to recommend the program to other teachers.

The current study yielded many positive findings as well as some challenges. As evidenced by high ratings across areas, teachers were able to implement many parts of the program such as the evidence-based strategies provided by *ASSIST*. The vast majority (98%) of participants stated that they would recommend *ASSIST* to their fellow colleagues. The current study also found that participating in the *ASSIST for ADHD* module positively improved teachers' attitudes and beliefs regarding the disorder and that the program itself did not have any significant negative effects on participants. Given the timeline of the current study, many participants noted that the COVID-19 pandemic made their participation in *ASSIST* and work within their respective teaching roles more difficult than anticipated. Detailed findings across research questions and their significance are summarized in the next section.

**Research Question 1: Is *ASSIST for ADHD* implemented by classroom teachers in the manner it was designed to be?** The participant recruitment methods successfully yielded a diverse sample of teachers based on ranges of age at participation, level of education, size of community taught in, and grades taught. The demographic of sex was not as diverse as the majority of participants (82%) were female. Although this is not a diverse sample, it is representative of the proportion of women working in the field of education in Canada. Statistics Canada reports that 84% of elementary and kindergarten teachers are female (Statistics Canada, 2014). Recruitment methods that worked especially well were word-of-mouth methods and recruitment via social media. Participant attrition occurred throughout the current study. A detailed breakdown can be found in Figure 1.

While not every participant completed all six sessions of the ADHD module, 58% ($N$ = 56) of participants completed at least one full session and were able to get a brief overview of the structure, design, and content of *ASSIST*. The majority of teachers also reported having reviewed

the module content carefully and that they attempted 46% of strategies learned from the sessions. Since teachers had to choose strategies that they considered applicable to their classroom out of a large array, 46% out of all strategies is considered a positive outcome. The current study did find that teachers were not as successful as initially hypothesized in following *ASSIST* session plans, however, given the timing of the study and the added work demands during COVID-19 it is likely that participants had to prioritize other aspects of their teaching role at the time. Previous research supports this hypothesis. Pressley et al. (2021) found that teachers reported that the school environment and having to balance teaching while adapting to the frequent pandemic-related changes greatly influenced their stress levels. Other studies have also shown a general sense of teachers feeling overworked during the COVID-19 pandemic (Chin et al., 2022; Heffernan et al., 2021)

Similar to previous studies (e.g., (Damschroder et al., 2009; Elik et al., 2015) key strengths of *ASSIST for ADHD* were identified by participants to be its comprehensiveness, accessibility, collaborative nature, and easily understandable content. Post-intervention data showed that the majority of teachers report still using at least some of the strategies learned from *ASSIST* (87.5%) and that it is very likely that they will continue to use those strategies in the future (91.3%).

**Research Question 2: What is the clinical effectiveness of *ASSIST for ADHD*?**

Overall, the ADHD module has proven to positively impact teachers' attitudes and beliefs after exposure to the program. This finding reflects those of previous studies which have examined psychoeducational approaches and their impact on attitudes. The broader literature suggests that providing factual information on a disorder not only increases target audiences' knowledge but also leads to a range of other positive outcomes, including more positive attitudes (Holtz &

Tessman, 2007; Nussey et al., 2013; Odom et al., 1999). Finding that *ASSIST* improved teachers attitudes is significant as research has shown negative attitudes regarding NDDs being a major barrier to working effectively with children with ADHD (Greenway & Rees Edwards, 2021). When analyzing teachers' use of behavioural and academic evidence-based strategies, it was found that usage of behavioural strategies did not increase, however, there was a significant increase in the frequency of academic strategies usage after exposure to *ASSIST*. It could be argued that teachers' were already implementing behavioural strategies before their participation in *ASSIST*, as they are often considered more helpful to the overall classroom environment (Bussing et al., 2012). Lastly, the current study also found that participants' distress ratings increased significantly while participating in the ADHD module. As identified by participants, high distress ratings almost always resulted from circumstances surrounding the COVID-19 pandemic, the high demands of teaching, and the lack of support from their employers (i.e., not being given extra time to spend on professional development).

**Research Question 3: What was teachers' satisfaction with the ADHD module for *ASSIST*?** Scores on the teacher satisfaction questionnaire were high across factors. Participants found the *ASSIST* program easy to understand, adaptable, and accessible. This is important as these are all factors that are commonly named as facilitators of the implementation of school-based interventions (Greenway & Rees Edwards, 2021; Lawson et al., 2022; Long et al., 2016). *ASSIST* was created in collaboration with teachers and administrators, it uses teacher-friendly language, and provides evidence-based interventions. All these factors resulted in participants reporting satisfaction with the program. Participants also noted that the program encouraged collaboration between families, teachers, and their students. The fact that using ASSIST created a more collaborative approach in teachers is noteworthy as collaboration with families has

previously been found to be a factor that strengthens ADHD interventions (DuPaul & Power, 2008). The supplemental materials provided by *ASSIST* were praised as very useful and the participants indicated that learned new things from the program. Teachers also noted that they could apply the information they have learned to new students in the future and 98% said that they would recommend *ASSIST for ADHD* to other teachers and education colleagues.

**Research Question 4: How did the COVID-19 pandemic impact the effectiveness and implementation of *ASSIST*?** The majority of teachers reported that there were changes to their teaching location due to the pandemic while participating in the current study. It was noted that 47% of teachers had to switch their classes to online, which caused an immense change in their work routine and required extra time commitment while also staying on top of their *ASSIST* participation. Given this finding, the previously mentioned lower-than-anticipated implementation scores are logical. Only 2% of participants reported that the pandemic had no impact on their teaching at all. As previously discussed, studies have shown that teachers took on more work during the pandemic, making it difficult to balance their tasks and prioritize (Heffernan et al., 2021; Pressley et al., 2021). With that in mind, the high participation of teachers in the program despite being in the middle of a pandemic is commendable and suggests that *ASSIST* was accessible and deemed to be worthy of their time.

**Strengths and Limitations**

When interpreting the results of the current study, several strengths and limitations should be considered. A major strength of this study is the recruitment of a diverse sample from all over Canada who were able to provide feedback from the perspective of teachers working firsthand with students with ADHD. Additionally, the *ASSIST for ADHD* program itself consists of a vast variety of evidence-based information and strategies and was designed by a team of

researchers, clinicians, and educators who have extensive knowledge in the field of ADHD. Finally, using the RE-AIM framework to guide analysis provided the necessary structure and allowed us to successfully evaluate the implementation of *ASSIST* within the school setting and determine its effectiveness.

Despite these strengths, the current study was limited in two main ways. First, the study and data collection took place during a worldwide pandemic that had major effects on teachers, students, and school environments. Aspects such as the implementation results of the current study should therefore be interpreted with caution. It is likely that the data would look different if it was gathered during a school year that was not as affected by the pandemic. Secondly, the current study did not collect data on the direct effect of the program on students. Data on behavioural and academic change in individual students whose teachers took part in *ASSIST* could have enriched the study results.

**Clinical Implications**

The results of the current study in combination with previous research demonstrate the opportunity for the use of an e-learning tool like *ASSIST* within the education system. Asides from barriers presented by the COVID-19 pandemic, participants reported lack of time as a common barrier in their day-to-day lives as teachers. Ensuring that a program like *ASSIST* can be effective is a great start to improving educators' ability to work with their ADHD students but ensuring that they also have the proper time to implement learned strategies is just as important. Advocating for more professional development time within the regular workday of teachers should be an important next step.

The findings of the current study also have implications for the work of school psychologists in the education system. *ASSIST* combines evidence-based knowledge from

several areas of ADHD research into one comprehensive tool. Having a program like *ASSIST* available can be a valuable resource to recommend within their school board to administrators, teachers, and educational assistants. By doing so, school psychologists can be confident in their recommendation knowing that the program has undergone several stages of testing and limit the time otherwise spent trying to find books or similar resources that they could recommend.

**Conclusion**

The current study provides valuable information on how to implement *ASSIST* in the future. This study also shows that *ASSIST* can be an accessible and affordable way to provide teachers with evidence-based strategies and information about ADHD that they self-reportedly have been lacking to this point (Froese-Germain & Riel, 2012). Even though we have no direct data on the effectiveness of the program on individual students, we know that the program was able to positively influence teachers and provide them with useful information that was new to them. Thus, *ASSIST for ADHD* can be an effective tool to equip teachers to support students with ADHD. If teachers have the knowledge and skill to effectively work with their ADHD students and self-implement interventions, the burden on the schools and healthcare system could be reduced and the educational experience of students greatly improved.

**Table 1**

*RE-AIM framework for ASSIST*

| Core | Definition |
|---|---|
| Reach | The absolute number, proportion, and representativeness of individuals who are willing to participate in a given initiative. |
| Effectiveness | The impact of an intervention on outcomes, including potential negative effects, quality of life, and economic outcomes. |
| Adoption | The absolute number, proportion, and representativeness of intervention agents who are willing to initiate a program. |
| Implementation | Refers to the intervention agents' fidelity to the various elements of an intervention's protocol. This includes consistency of delivery as intended and the time and cost of the intervention. |
| Maintenance | The individual level is defined as the long-term effects of a program on outcomes 6 or more months after the most recent intervention contact. |

## Table 2

*Research Questions, Measures, and Questions used*

| Research Question | RE-AIM component | Sub-Research Questions | Measures | Questions from Measure used |
|---|---|---|---|---|
| 1. Is ASSIST for ADHD implemented by classroom teachers in the manner that it was designed to be implemented? | Reach | 1. How did recruitment methods work to engage potential participants? | Computer-generated user statistics; number of access codes distributed | N/A |
| | | 2. Did recruitment methods result in a diverse and representative sample of teachers? | Participant Characteristic Questionnaire | 1) Age<br>2) Sex<br>3) How would you best describe your ethnic or cultural heritage?<br>4) What is your highest level of education completed?<br>5) How would you describe the community where you teach? [Rural/Town/City…]<br>6) For how long have you been teaching?<br>7) What grade are you currently teaching?<br>10) How did you hear about the ASSIST program? |
| | Adoption | 1. What proportion of teachers utilized the *ASSIST for ADHD* module? | Computer-generated user statistics; number of those who logged on | N/A |
| | | 2. What was adherence like to the *ASSIST for ADHD module*? | Computer-generated user statistics; number of sessions completed | N/A |
| | Implementation | 1. What was the extent to which teachers utilized the strategies within the program? | COVID Impact and Status Update | 5) How carefully did you review the ASSIST program content for the sessions you reviewed, including the videos, text, and activities?<br>6) What percentage of the strategies from the ASSIST sessions you reviewed did you try to use? It is OK to estimate the percentage, we just want to know if you implemented none (0%), a few (e.g., 30%), some (e.g., 65%), or all (100%) of the strategies<br>7) How successful were you with following the Session Plans generated at the end of each of the 6 sessions for the sessions you completed? |
| | | | Implementation Questionnaire | 1A) Are you currently using any of the strategies provided in ASSIST in the classroom?<br>1C) How often are you currently using strategies you learned from the ASSIST program? |
| | | 2. What facilitated and impeded the implementation of the strategies presented in the module? | Implementation Questionnaire | 8) What has made the ASSIST program easy to use and why? [Open text response]<br>9) What has made the ASSIST program hard to use and why?<br>10) What changes to the program could have helped you stay more involved in the ASSIST program for the full 6-8 weeks? |

| | | | | |
|---|---|---|---|---|
| | Maintenance | 1. Do teachers report continuing to use the strategies at 6-months post intervention? | 6-Month Follow-Up Questionnaire | 2) Are you currently using any of the strategies provided in ASSIST in the classroom?<br>3) How often are you using strategies you learned from the ASSIST program?<br>4) What is the likelihood that you will continue using the strategies you learned in ASSIST in the future with other students? (i.e., in the next month, in the next 1 to 2 years?) |
| 2. What is the clinical effectiveness of ASSIST for ADHD? | Effectiveness | 1. What were the positive impacts of the program on proximal factors (teacher attitudes, beliefs, and use of evidence-based strategies)? | Teacher Attitude and Beliefs Questionnaire | Teacher ratings of negative statements surrounding four factors:<br>1) Lack of Control<br>2) Negative Classroom Effects<br>3) Diagnostic Legitimacy<br>4) Perceived (teacher) Competence |
| | | | Instructional and Behaviour Management Approaches Survey | Frequency ratings of usage of adaptations, strategies, and approaches (e.g., preferential seating, providing assistance during transitions, proximity control, providing positive teacher attention, using nonverbal cues to redirect) |
| | | 2. What were the positive impacts on distal factors (teacher distress and well-being)? | Distress Thermometer | 1) How much of your distress is a result of COVID-19 related stressors and changes? |
| | | | Subjective Well-Being (Teacher) | 1) How much of your dissatisfaction within your teaching role is a result of COVID-19 related stressors and changes? |
| | | 3. Were there any negative impacts of the program? | Implementation Questionnaire | 4) Please share any ways ASSIST has had any unintended negative impacts |
| 3. What is teacher satisfaction of ASSIST for ADHD? | | | Teacher Satisfaction Questionnaire | Teacher rating of level of agreement with statements about ASSIST (e.g., The content of the intervention was presented in a manner that was easy to understand.) |
| 4. How did the COVID-19 pandemic impact implementation and effectiveness? | | | COVID-19 Questionnaire | 1) Since starting in the ASSIST study, has there been any changes in your teaching location due to the COVID-19 pandemic (i.e., move to online teaching)? [Yes/No]<br>1.1) Thinking about the time from starting the study to now, what percentage of the time were you teaching online<br>1.2) Did you feel that the interventions presented in the ASSIST program were adaptable to an on-line teaching format<br>2) Overall, how much has the pandemic impacted your teaching from the time of starting this study until now? |

Table 3

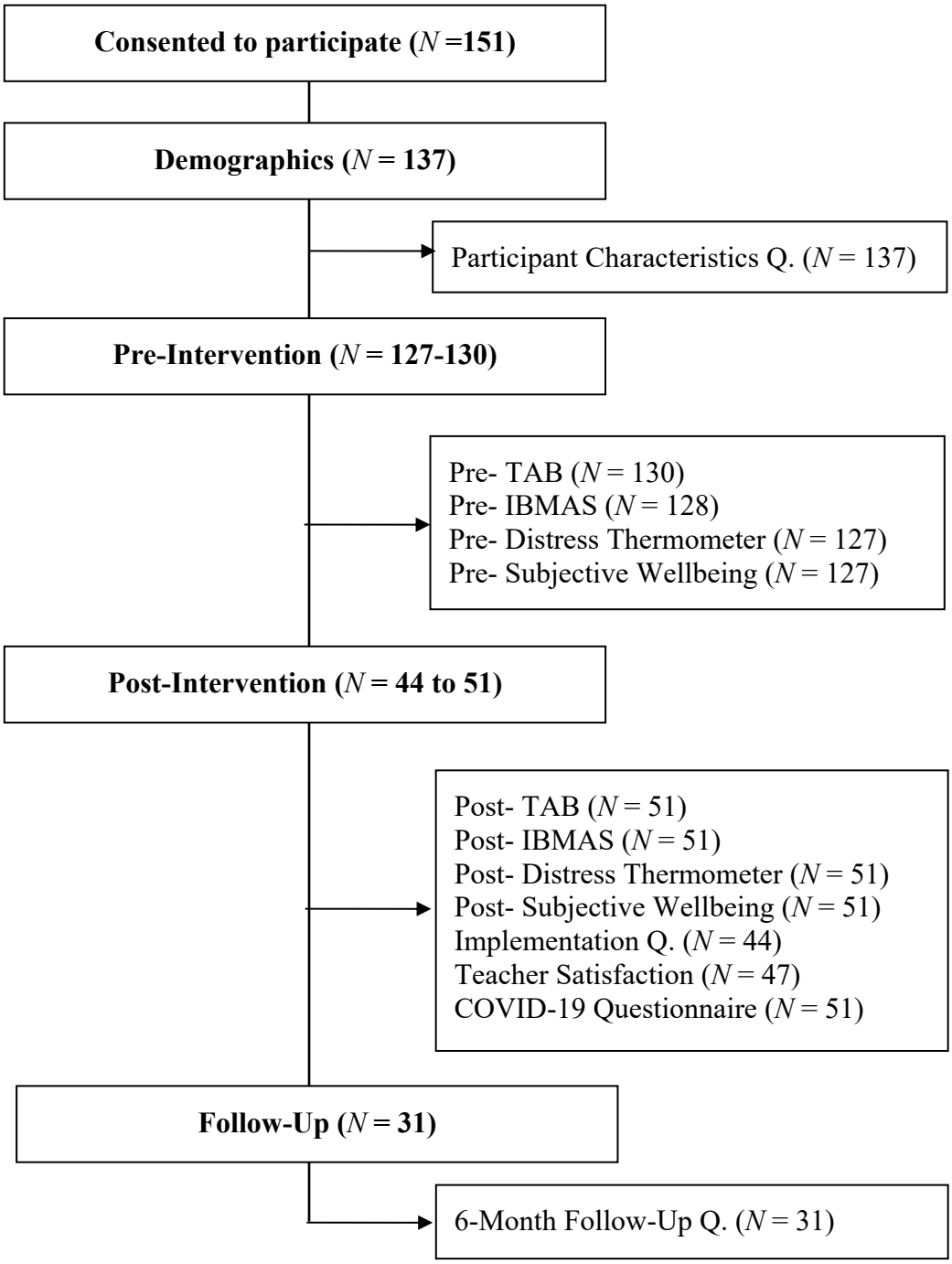
*Teacher Satisfaction Questionnaire Results*

| Teacher Satisfaction Items | Mean Rating | Standard Deviation |
|---|---|---|
| Question 1: Easy to Understand | 4.70 | 0.62 |
| Question 2: Easily Adaptable | 4.55 | 0.80 |
| Question 3: Useful Feedback | 3.87 | 1.19 |
| Question 4: Encouraged Collaboration | 4.45 | 0.80 |
| Question 5: Collaborative Presentation | 4.72 | 0.62 |
| Question 6: Right Amount of Time to Implement | 4.09 | 1.16 |
| Question 7: Accessible and User-Friendly | 4.55 | 0.83 |
| Question 8: Useful Worksheets | 4.55 | 0.88 |
| Question 9: Supplemental Information was Useful | 4.40 | 0.83 |
| Question 10: Program Flexibility | 4.36 | 0.92 |
| Question 11: Learned New Things | 4.04 | 1.29 |
| Question 11.2: Applicable to Other Students | 4.64 | 0.61 |
| Question 12: Implement Interventions | 3.55 | 1.27 |
| Question 15: Recommend to Other Teachers | 0.98 | 0.15 |
| Total | 54.88 | 5.89 |

*Ratings: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)*

Figure 1

*Sample Sizes Consort Flow Diagram*



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APPENDIX A

*Items containing and asterisk were included in the analysis for the current study

## Screening Questionnaire

Author made, 2021. Modified from our previous screening questionnaires from past studies.

**[Pre-Intervention Measures Only]**

**Instructions:** Thank you for your consideration to participate in the *ASSIST Sustainability and Implementation Study*. This study is evaluating the "scale out" of the *ASSIST* online program for teachers of children with one of three neurodevelopmental disorders: Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), or a Learning Disorder (LD). The first step is to make sure that this implementation study is appropriate for you to participate in. This questionnaire will take about 2 minutes to complete. If you are eligible based on this questionnaire, you will be directed to the Information and Consent Form which will provide details about the study and your research rights. If you are not eligible, you will receive an automated notification of this outcome.

[Note: Bolded responses are required to participate in the study. If no bolded response, the question is only used for description purposes and not to assess eligibility]

*1. Are you currently working as a teacher in a regular mainstream classroom setting within a Canadian school? [**Yes**/No]

[If NO] This study is designed for teachers currently working in a regular mainstream classroom setting in a Canadian school (grades 1 to 12).

*2. Is English the language of instruction in your classroom. [Yes/No]

[IF YES] Proceed to question 3.

[If NO] The *ASSIST* program is currently only available in English. You can either proceed with this study but understand the information is in English, or you can leave your email address and we will let you know when we have a study being conducted with the French version of *ASSIST*.

Would you like to continue (Yes/No).

[IF NO] Please leave an email at which we can contact you in the future (textbox).

*3. Do you live and teach in Canada? [**Yes**/No]

a. [IF YES] In which province/territory do you live? [Drop down menu of province and territories]

[If NO] This study is designed for teachers currently living and teaching in Canada.

*4. Do you have a student in your class with ADHD, Autism Spectrum Disorder, or a Learning Disability that you would like to help by using the *ASSIST* program? [**Yes**/No]

[If NO] This study is designed for teachers who have a student in their classroom that they would like to help by using the *ASSIST* program.

*5. What grade do you teach? [Grade Drop Down – Pre-Kindergarten; Kindergarten, **1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12**]

[If Pre-Kindergarten or Kindergarten was selected] This study is designed for teachers of grades 1 to 12.

*6. Which module of *ASSIST* would you like to access:

i. ADHD [checkbox]
ii. Autism Spectrum Disorder (ASD) [checkbox]
iii. Learning Disabilities (LD) [checkbox]

*7. Have you participated in a previous *ASSIST or Teacher Help* studies or reviewed the *ASSIST* or *Teacher Help* content? [Yes/**No**]

[If YES] This study is designed for teachers who have not previously participated in *ASSIST or Teacher Help* studies or reviewed the *ASSIST* or *Teacher Help* content.

*8. Do you plan to be on a leave of absence at any time over the course of this school year? [Yes/**No**]

[If YES] This study is designed for teachers who do not plan to be on a leave of absence at any time over the course of this school year.

9. How did you hear about the *ASSIST* program? Please check all that apply.

Google Ad
Website Ad
YouTube Ad
Email
Internet search (please specify) [Textbox]
Professional/community organization (please specify) [Textbox]
Print advertisement (please specify) [Textbox]
School board (please specify) [Textbox]
Newspaper (please specify) [Textbox]
*ASSIST* Facebook
- Facebook post
- Facebook group
- Facebook Live event

*ASSIST* LinkedIn
*ASSIST* Instagram

Other Facebook account or group (please specify) [Textbox]
Other LinkedIn account or group (please specify) [Textbox]
Podcast (please specify) [Textbox]
Other (please specify) [Textbox]

**Message for Non-Eligibility**

If the potential participant does not meet the basic inclusion criteria for the study, they will receive this message:

Thank you for your consideration to participate in the *ASSIST Sustainability and Implementation Study*. Based on your responses, you are not eligible to participate in this study. To participate you must be:

1. Currently working as a teacher in a regular classroom setting in a Canadian school (grades 1 to 12) and be able to complete the program in English.
2. Currently have one student in your classroom with ADHD, LD, or ASD who you would like to help by using this program.

If you would like to discuss further, please contact the *ASSIST* research coordinator at: assist@dal.ca

APPENDIX B

## Participant Characteristics Questionnaire

Author made, 2021. Modified from our previous participant characteristics questionnaires from past studies.

**[Pre-Intervention Measures Only]**

**Instructions:** The following questions ask for some basic information about you. This will allow the research team to describe, as a group, the study sample, and assess conditions in which teachers access and implement the *ASSIST* online program. We will also ask you about how you first learned about *ASSIST* and factors that impacted your decision to join the program. This questionnaire will take approximately 5 minutes to complete.

### General Information

*1. Your age [drop down menu]

- Numbers for drop down menu: 21,22,23,24,25…65+

*2. Your sex [dropdown menu]

- Male
- Female
- Other, please specify [text box]

*3. How would you best describe your ethnic or cultural heritage? [Drop Down: White/ /Black/Aboriginal /South Asian/Chinese/Filipino/Latin-American/Arab/West Asian/South East Asian/Korean/Japanese/Other (Please Specify) [Textbox]]

*4. What is your highest level of education completed? [dropdown menu]

- Bachelors (or equivalent)
- Master's
- PhD
- EdD
- Other, please specify: [text box]

*5. How would you describe the community where you teach? [Rural/Town/City under 500,000 people/City over 500,000 people]

*6. For how long have you been teaching? Please round up to the nearest year. [dropdown menu] years

- Numbers for years: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,… 30+

*7. What grade are you currently teaching? [dropdown menu]

- Numbers for dropdown menu: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
- Other, please specify (e.g., if teaching a split class) [text box]

8. Which grade(s) have you taught in your teaching career? [dropdown menu, multiple check options]

- Elementary (1-6) [If selected 8.1 appears]
- Junior High School (7-9) [If selected 8.2 appears]
- Senior High School (10-12) [If selected 8.3 appears]

8.1. If you taught elementary, for how many years did you do so?
[Dropdown menu] Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,… 30+

8.2. If you taught junior high, for how many years did you do so?
[Dropdown menu] Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,… 30+

8.3. If you taught high school, for how many years did you do so?
[Dropdown menu] Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,… 30+

## ***ASSIST* Program**

*9. Which *ASSIST* module are you planning to complete?

- *ASSIST for Attention-Deficit/Hyperactivity Disorder (ADHD)*
- *ASSIST for Autism Spectrum Disorder (ASD)*
- *ASSIST for Learning Disabilities (LD)*

**The following questions ask you about how you first found out about the *ASSIST* program and what factors impacted your decision to participate.**

*10. How did you hear about the *ASSIST* program? Please check all that apply.

Google Ad
Website Ad
YouTube Ad
Email
Internet search (please specify) [Textbox]
Professional/community organization (please specify) [Textbox]
Print advertisement (please specify) [Textbox]
School board (please specify) [Textbox]
Newspaper (please specify) [Textbox]
*ASSIST* Facebook
- Facebook post
- Facebook group
- Facebook Live event

*ASSIST* LinkedIn
*ASSIST* Instagram
Other Facebook account or group (please specify) [Textbox]

Other LinkedIn account or group (please specify) [Textbox]
Podcast (please specify) [Textbox]
Other (please specify) [Textbox]

11. What information in the advertisement for *ASSIST* caught your attention?
[Open text box]

12. What made you interested to participate in the program?
[Open text box]

13. What did you think the program could help you accomplish?
[Open text box]

14. How could we get more teachers to participate in a program like this? Please check all that apply and elaborate in the text boxes.
☐ Through an organization (please elaborate) [Open text box]
☐ School board
☐ Social media channels (please elaborate) [Open text box]
☐ Referral (please elaborate) [Open text box]
☐ Other (please elaborate) [Open text box]

15. What kind of information or evidence did you consider when deciding to participate in the *ASSIST* program?
[Open text box]

16. How much does knowing that this program is evidence-based (i.e., tested scientifically to demonstrate its effectiveness) weigh into your decision to use the program?

☐ It does not weigh into my decision-making
☐ It contributes a small amount to my decision-making, and is not one of the main factors
☐ It contributes a fair amount to my decision-making, but is only one of many factors
☐ It contributes a lot to my decision-making, and is a key factor
☐ It is the only factor I consider in my decision-making

APPENDIX C

## Teacher Attitudes and Beliefs Questionnaire

Author made, 2017. Adapted from:

Kos, J. (2008). What do primary teachers know, think and do about ADHD? *Australian Council for Educational Research, Teaching and Learning and Leadership*: http://research.acer.edu.au/tll_misc/8

**[Pre- and Post-Intervention Measure; This questionnaire is displayed to all participants at post-intervention regardless of how many sessions completed or implemented]**

**Instructions:** Please indicate which answer best reflects your belief for each question, based on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

All items are rated on the following scale:

- Strongly Disagree (1)
- Disagree (2)
- Neutral (3)
- Agree (4)
- Strongly Agree (5)

This questionnaire will take approximately 5 minutes to complete.
*Reversed coding

***Factor 1: Lack of Control***

| ADHD | LD | *ASD |
|---|---|---|
| You cannot expect as much from a student with ADHD as you can from other students. | You cannot expect as much from a student with LD as you can from other students. | You cannot expect as much from a student with ASD as you can from other students. |
| Students with ADHD could control their behaviour if they really wanted to. | Students with LD could do better academically if they really wanted to. | Students with ASD could control their behaviour if they really wanted to |
| Students with ADHD misbehave because they are naughty. | Students with LD misbehave because they are naughty. | Students with ASD misbehave because they are naughty. |
| Students with ADHD could do better if only they'd try harder. | Students with LD could do better if only they'd try harder. | Students with ASD could do better if only they'd try harder. |
| Students with ADHD misbehave because they don't like following rules. | Students with LD misbehave because they don't like following rules. | Students with LD misbehave because they don't like following rules. |
| *Managing the behaviour of students with ADHD is easy. | Managing the learning challenges of students with LD is easy. | Managing the behavioural and social challenges of students with ASD is easy. |

***Factor 2: Negative Classroom Effects***

| ADHD | LD | *ASD |
|---|---|---|

| | | |
|---|---|---|
| Having a student with ADHD in my class would disrupt my teaching. | Having a student with LD in my class would disrupt my teaching. | Having a student with ASD in my class would disrupt my teaching. |
| I would feel frustrated having to teach a student with ADHD. | I would feel frustrated having to teach a student with LD. | I would feel frustrated having to teach a student with ASD. |
| Students with ADHD should be taught by special education/specialist teachers, not classroom teachers. | Students with LD should be taught by special education/specialist teachers, not classroom teachers. | Students with ASD should be taught by special education/specialist teachers, not classroom teachers. |
| The extra time teachers spend with students with ADHD is at the expense of students without ADHD. | The extra time teachers spend with students with LD is at the expense of students without LD. | The extra time teachers spend with students with ASD is at the expense of students without ASD. |
| Other students don't learn as well as they should when there is a student with ADHD in the classroom. | Other students don't learn as well as they should when there is a student with LD in the classroom. | Other students don't learn as well as they should when there is a student with ASD in the classroom. |

.

***Factor 3: Diagnostic Legitimacy***

| ADHD | LD | *ASD |
|---|---|---|
| ADHD is a valid diagnosis. | LD is a valid diagnosis. | ASD is a valid diagnosis. |
| ADHD is an excuse for students to misbehave. | LD is an excuse for students to misbehave | ASD is an excuse for students to misbehave. |
| ADHD results in a legitimate educational problem. | LD results in a legitimate educational problem. | ASD results in a legitimate educational problem. |
| ADHD is a behaviour disorder that should not be treated with medication. | LD is a behaviour disorder that should not be treated with medication. | ASD is a behaviour disorder that should not be treated with medication. |

***Factor 4: Perceived Competence***

| ADHD | LD | *ASD |
|---|---|---|
| I have the skills to deal with students with ADHD in my class. | I have the skills to deal with students with LD in my class. | I have the skills to deal with students with ASD in my class. |
| I have the ability to effectively manage students with ADHD. | I have the ability to effectively manage students with LD. | I have the ability to effectively manage students with ASD. |
| I am limited in the way I manage a student with ADHD. | I am limited in the way I manage a student with LD. | I am limited in the way I manage a student with ASD. |

APPENDIX D

## *Instructional and Behaviour Management Approaches Survey

Martinussen, R, Tannock, R, & Chaban, P. Teachers reported use of instructional and behavior management practices for students with behavior problems: Relationship to role and level of training in ADHD. *Child Youth Care Forum*, 2011;*40*: 193-210. doi: 10.1186/1471-2458-12-751.

**[Pre- and Post-Intervention Measure; This questionnaire is displayed to all participants at post-intervention regardless of how many sessions completed or implemented]**
**Instructions:** Please indicate the frequency with which you have used the various instructional adaptations, instructional strategies, and behavioural management approaches over the last [month at baseline, 6-8 weeks at post-intervention]

All items are rated on the following scale:

- Rarely (1)
- Once in a While (2)
- Occasional Use (3)
- Sometimes (4)
- Most of the Time (5)

This questionnaire requires approximately 5 minutes to complete.

1. Preferential seating 1 2 3 4 5
2. Providing assistance during transitions 1 2 3 4 5
3. Proximity control 1 2 3 4 5
4. Providing positive teacher attention 1 2 3 4 5
5. Using nonverbal cues to redirect 1 2 3 4 5
6. Frequent communication with parents 1 2 3 4 5
7. Implementing positive behavior support plans 1 2 3 4 5
8. Selective ignoring 1 2 3 4 5
9. Verbal reprimand 1 2 3 4 5
10. Providing consequences for misbehavior 1 2 3 4 5
11. Teaching appropriate behavior 1 2 3 4 5

12. Functional behavioral assessment 1 2 3 4 5

13. Self-management system (self-monitoring) 1 2 3 4 5

14. Daily report card 1 2 3 4 5

15. Behavioral contract 1 2 3 4 5

16. Time out 1 2 3 4 5

17. Response Cost 1 2 3 4 5

18. Remove student from class for misbehavior 1 2 3 4 5

19. Modifying language for instruction 1 2 3 4 5

20. Chunking assignments into smaller sections 1 2 3 4 5

21. Simplifying instructions/step by step delivery 1 2 3 4 5

22. Providing written directions as well as oral directions 1 2 3 4 5

23. More immediate and frequent feedback 1 2 3 4 5

24. Providing concrete cues/visuals 1 2 3 4 5

25. Providing explicit strategy instruction 1 2 3 4 5

26. Shortening assignments 1 2 3 4 5

27. Teaching student how to organize or plan 1 2 3 4 5

28. Highlighting key points for students 1 2 3 4 5

29. Giving student choice in assignments/tasks 1 2 3 4 5

30. Providing a study or peer tutor 1 2 3 4 5

31. Adjusting materials (color/structure) 1 2 3 4 5

32. Providing alternative formats for tests/assignments 1 2 3 4 5

33. Helping student set goals and monitor progress 1 2 3 4 5

34. Teaching student how to use assignment notebook 1 2 3 4 5

35. Providing advance organizer for content 1 2 3 4 5

36. Lowering expectations 1 2 3 4 5

APPENDIX E

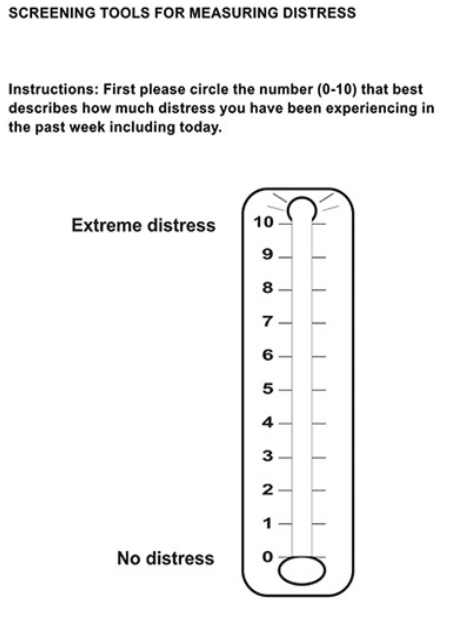
## Distress Thermometer

Adapted from: National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Distress management. Retrieved from http://www.nccn.org/professionals/physician_gls/distress.pdf. 2019.

Ownby KK. Use of the Distress Thermometer in Clinical Practice. *Journal of the advanced practitioner in oncology*, 2019;*10*(2), 175–179.

**[Pre- and Post-Intervention Measure; This questionnaire is displayed to all participants at post-intervention regardless of how many sessions completed or implemented]**

***Instructions:** Please indicate your own level of distress related to your teaching role on the visual thermometer, ranging from 0 "No distress" to 10 "Extreme distress." This questionnaire requires approximately 1 minute to complete.




How much of your distress is a result of COVID-19 related stressors and changes? [Drop down menu with the following options:

Nothing
Very little
Some
Quite a bit
A lot

Please explain your rating: [Open textbox]

APPENDIX F

## Subjective Well-Being (Teacher)

Adapted from: Statistics Canada. General Social Survey- Canadians at Work and Home. Retrieved from https://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&lang=en&Item_Id=302913. 2016.

**[Pre- and Post-Intervention Measure; This questionnaire is displayed to all participants at post-intervention regardless of how many sessions completed or implemented]**

**Instructions:** This questionnaire is used to evaluate your perceived level of satisfaction within your teaching role. This questionnaire will take about 1 minute to complete.

*Using a scale of 0 to 10 where 0 means "Very dissatisfied" and 10 means "Very satisfied", how do you feel about your teaching role as a whole right now?

0 Very dissatisfied
1 I
2 I
3 I
4 I
5 I
6 I
7 I
8 I
9 V
10 Very satisfied

Min = 0; Max = 10

How much of your dissatisfaction within your teaching role is a result of COVID-19 related stressors and changes? [Drop down menu with the following options]:

- Nothing
- Very little
- Some
- Quite a bit
- A lot

Please explain your rating: [Open textbox]

APPENDIX G

## *Teacher Satisfaction Questionnaire

Author made, 2021. Modified from our previous teacher satisfaction questionnaires from past studies.

**[Post-Intervention Measures Only: This questionnaire is only displayed to those participants that responded that they had reviewed at least 1 session, based on Question 3 on the COVID Impact & Status Update Questionnaire]**

**Instructions:** Based on the 6-point scale below, please indicate your level of agreement with each statement about the *ASSIST* program that you have participated in. We understand that not all teachers were able to review and/or implement all sessions due to the changing COVID-19 restrictions. As such, please complete the following questions reflecting on all the sessions that you were able to review and/or implement. Please only select the N/A option if you were not able to *implement strategies in your classroom* due to moving to online teaching as a result of COVID-19 restrictions.

All items are rated on the following scale:

- Strongly Disagree (1)
- Disagree (2)
- Neutral (3)
- Agree (4)
- Strongly Agree (5)
- Not Applicable (6)

This questionnaire requires approximately 5 minutes to complete.

1. The content of the intervention was presented in a manner that was easy to understand:
   1 2 3 4 5 6

2. The content of the intervention was easily adaptable:
   1 2 3 4 5 6 N/A

3. Completing the check-in questions at the beginning of each session of the program was easy and resulted in useful feedback:
   1 2 3 4 5 6 N/A

4. The intervention encouraged a collaborative process between the student, teacher, and parent/caregivers:
   1 2 3 4 5 6

5. The intervention was presented in a collaborative manner (as opposed to authoritarian manner):
   1 2 3 4 5 6

6. The interventions took just the right amount of time to implement:
   1 2 3 4 5 6 N/A

7. The delivery of the intervention through the Internet was accessible and user-friendly:
   1 2 3 4 5 6

8. The worksheets that went along with the sessions were useful:
   1 2 3 4 5 6 N/A

9. The supplemental information (e.g., web-links, videos, PDFs) were useful:
   1 2 3 4 5 6

10. The delivery of the intervention in a flexible format (so I could work on it based on my schedule) made it easier to implement:
    1 2 3 4 5 6 N/A

11. I learned new things from the *ASSIST* program:
    1 2 3 4 5 6 N/A

    11.1. Please explain what you have learned: [text box]

    11.2 I think I could use what I learned and apply this information to other students in my current class or future classes:
    1 2 3 4 5 6 N/A

12. I was able to implement the interventions suggested by the *ASSIST* program.
    1 2 3 4 5 6 N/A

    12.1 What percentage of the interventions suggested by the *ASSIST* program were you able to implement. [drop down menu]
    Numbers for drop down menu: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,… up to 100%

13. My favorite aspects of the intervention were: [Open text box]

14. My least favorite aspects of the intervention were: [Open text box]

15. Would you recommend this program to other teachers? Yes/No
    15.1 Please explain why or why not: [Open text box]

16. If the *ASSIST* team was to develop another module, which mental health disorder or mental health topic would you like the module to cover? [Open text box]

17. Other comments on the intervention: [Open text box]

APPENDIX H

## Implementation Questionnaire

Author made, 2021.

**[Post-Intervention Measures Only: This questionnaire is only displayed to those participants that responded that they had implemented strategies from at least 1 session, based on Question 4 on the COVID Impact & Status Update Questionnaire]**

**Instructions:** The following questions will ask you to report on your use of the *ASSIST* program. We understand that not all teachers were able to implement all sessions due to the changing COVID-19 restrictions. As such, please complete the following questions reflecting on all the sessions that you were able to implement. This questionnaire will take about 5 minutes to complete.

*1A) Are you currently using any of the strategies provided in *ASSIST* in the classroom?
- o Yes, most of the strategies
- o Yes, some of the strategies
- o Yes, a few of the strategies
- o No, none of the strategies
- o No, as teaching moved to online teaching and as such I was not able to implement these strategies (x2?)

1B) Which strategies from *ASSIST* are you continuing to use? [Please list the strategies you are using: Open text box]

*1C) How often are you currently using strategies you learned from the *ASSIST* program?
- o Always (every day)
- o Often (4 days per week)
- o Sometimes (2 or 3 days per week)
- o Rarely (1 day per week)
- o Not at all (0 days a week)

2) Describe how well you felt equipped to use the strategies in *ASSIST*? [Open text box]

3) What are some of the ways *ASSIST* had a positive impact? [Open text box]

4) *Please share any ways *ASSIST* has had any unintended negative impacts. [Open text box]

5) What surprised you about the outcomes of the *ASSIST* program? [Open text box]

6) What has been the most helpful thing you have learned in *ASSIST* and why? [Open text response]

7) What has been the least helpful thing you have learned in *ASSIST* and why? [Open text response]

8) *What has made the *ASSIST* program easy to use and why? [Open text response]

9) *What has made the *ASSIST* program hard to use and why? [Open text response]

10) *What changes to the program could have helped you stay more involved in the *ASSIST* program for the full 6-8 weeks? [Open text box]

11) Now that *ASSIST* is over, what challenges, if any, have you faced to continue to use the strategies in the *ASSIST* program? [Open text box]

12) What parts of the program helped you stay involved in *ASSIST* the most? Please check all that apply.

Drop-down options: structure, email reminders, duration and number of sessions, online location, other [Open text box]

13) Is there anything else you would like to tell us about using the *ASSIST* program? [Open text response]

APPENDIX I

## 6-Month Follow-Up Questionnaire

Author made, 2021.

**[Post-Intervention Measure Only]**

**Instructions:** Thank you for your participation in the *ASSIST* Implementation Study. This 6-month follow-up questionnaire will help us to understand whether teachers continue to use the materials that they accessed in the *ASSIST* online program. This questionnaire will take about 5 minutes to complete.

1A) Did you complete or use the *ASSIST* program when it was offered in the 2020-21 school year?

a) Yes, I completed the entire *ASSIST* program.
b) I did not complete the entire *ASSIST* program, but I accessed some of the sessions.
    a. If this is selected, the participant is asked: How many sessions did you complete [Pull down menu from 1-6]
c) No, I did not use any of the *ASSIST* program during the 2020-21 school year.

1B) Did you complete or use the ASSIST program when it was re-offered in the 2021-2022 school year?

a) Yes, I have completed the entire *ASSIST* program
b) I did not complete the entire *ASSIST* program, but I accessed some of the sessions.
    a. If this is selected, the participant is asked: How many sessions did you complete [Pull down menu from 1-6]
c) No, I did not use any of the *ASSIST* program during the 2021-22 school year.

[If the participant answers a or b to either Question 1A or 1B, then the following items will be displayed]

*2. Are you currently using any of the strategies provided in *ASSIST* in the classroom?

- o Yes, most
- o Yes, some
- o Yes, a few
- o No

[IF YES]
*Which parts of *ASSIST* are you continuing to use? [Open text box]

*3. How often are you using strategies you learned from the *ASSIST* program?

- o Always (every day)
- o Often (4 days per week)
- o Sometimes (2 or 3 days per week)
- o Rarely (1 day per week)

- Not at all (0 days a week)

*4. What is the likelihood that you will continue using the strategies you learned in *ASSIST* in the future with other students? (i.e., in the next month, in the next 1 to 2 years?)

- Highly likely
- Likely
- Somewhat likely
- Not likely
- N/A (I did not start the program)

5. If the *ASSIST* team was to develop another module, which mental health disorder or mental health topic would you like the module to cover? [textbox]

6. Other comments on the intervention: [text box]

APPENDIX J

## COVID-19 Impact & Status Update Questionnaire

Author made, 2021.

**Instructions:** This questionnaire asks about the degree of impact the COVID-19 pandemic and restrictive measures have had on your ability to review and implement the content of the *ASSIST* program. This questionnaire will require approximately 5 minutes to complete.

**[Post-Intervention Measure Only]**

*1) Since starting in the *ASSIST* study, has there been any changes in your teaching location due to the COVID-19 pandemic (i.e., move to online teaching)? [Yes/No]

If Yes is selected:

*1.1 Thinking about the time from starting the study to now, what percentage of the time were you teaching online? (0%, 1-10%., 11-20%, 21-30%, 31-40%, 41-50%, 51-60%, 61-70%, 71-80%, 81-90%, 91-100%)

*1.2 Did you feel that the interventions presented in the *ASSIST* program were adaptable to an on-line teaching format? (0 Not at all, 1 Just a little, 2 Some, 3 A Fair Amount, 4 A Lot)

1.3 Please elaborate on any aspects of the ASSIST program you feel were more challenging to implement in an on-line teaching format than they would be in a classroom setting [Open textbox]

*2) Overall, how much has the pandemic impacted your teaching from the time of starting this study until now? (0 Not at all, 1 Just a little, 2 Some, 3 A Fair Amount, 4 A Lot)

2.1 Please elaborate on how the pandemic impacted your teaching [Open textbox]

3) How many sessions did you *review*? [pull down menu from 0 to 6]

3.1 Displays if Question 3 was answered with less than 6 sessions:

If you were **not** able to *review* the content for all 6 sessions, what were the primary barriers to being able to do so?

a. COVID-19 related barriers (e.g., school closures, move to online teaching)
b. Other [Textbox: Please elaborate: ]

4) How many sessions were you able to *implement* the suggested strategies? [pull down menu from 0 to 6]

4.1 Displays if Question 4 was answered with less than 6 sessions:

If you were **not** able to *implement* the strategies for all 6 sessions, what were the primary barriers to being able to do so?

a. COVID-19 related barriers (e.g., school closures, move to online teaching)
b. Other [Textbox: Please elaborate: ]

*5) How carefully did you review the *ASSIST* program content for the sessions you reviewed, including the videos, text, and activities?

1 (Not Carefully At All), 2, 3, 4, 5 (Very Carefully)

*6) What percentage of the strategies from the *ASSIST* sessions you reviewed did you try to use? It is OK to estimate the percentage, we just want to know if you implemented none (0%), a few (e.g., 30%), some (e.g., 65%), or all (100%) of the strategies.

0%, 1–20%, 21–40%, 41–60%, 61–80%, 81–99%, 100%

*7) How successful were you with following the Session Plans generated at the end of each of the 6 sessions for the sessions you completed?

(Not At All)1, 2, 3, 4, 5, 6, 7 (Very Successful)

8) While you were completing *ASSIST (or if unable to complete the ASSIST program, please think of the time since you were first enrolled in the ASSIST program)*, did you receive any additional in-service/professional development training focus on special education/exceptional learners (not specific to ADHD/ASD/LD)?

- Yes [If selected 3.1 appear]
- No
- N/A (I have not started the program)

3.1. Approximately how many hours of in-service/professional development training did you complete on special education/exceptional learners during this time? [dropdown menu]
Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,… 30+

9) While you were completing *ASSIST (or if unable to complete the ASSIST program, please think of the time since you were first enrolled in the ASSIST program)*, did you receive any additional in-service/professional development training focused specifically on ADHD/ASD/LD)?
   a. Yes [If selected 4.1 appears]
   b. No
   c. N/A (I have not started the program)

4.1. Approximately how many hours of professional development training did you complete on ADHD/ASD/LD during this time? [dropdown menu]
Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,… 30+

APPENDIX K

## Information and Consent Form- Teacher

**Study Title:** Evaluation of the sustainability and implementation of the *ASSIST* online program for teachers of children with neurodevelopmental disorders

**Short Title:** *ASSIST* Sustainability and Implementation Study

**Researchers:**

**Principal Investigator:**
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Dr. Jennifer Zwicker, PhD, University of Calgary

**Industry Partner:** Velsoft® Inc.

**Funding Agency:** Kids Brain Health Network

**Contact:** ASSIST@dal.ca





**Introduction**

You are being invited to take part in this research study, *Evaluation of the sustainability and implementation of the ASSIST online program for teachers of children with neurodevelopmental disorders*, because you are a classroom teacher practicing in Canada who is currently teaching a child in grades 1 to 12 with a diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), or a Learning Disability (LD). This information and consent form outlines information about the study and your rights as a participant. Before you decide to take part in this study, it is important that you understand the purpose of the study and your research rights by carefully reading this form.

Your participation in this study is voluntary and you are able to withdraw from the study at any time. Consent begins with the initial contact about the study and continues until the end of the study. You may contact the research team by email at assist@dal.ca to answer any questions you have during or after participation. You can withdraw your consent to participate at any time until data analysis begins in June 2021 by contacting the researchers, which will end your participation.

**How will the researchers do this study?**

There are high rates of students with neurodevelopmental disorders (NDDs) being taught in the classroom, and professional development opportunities for teachers are not always available to learn about how best to support these students in mainstream inclusive classrooms. Through collaboration with educators, the researchers have found that teachers want evidence-based information about NDDs, knowledge about intervention strategies, and a systematic and accessible approach to implementation of these strategies. The research team has previously evaluated the effectiveness of an online program *ASSIST*. They found that the program is well received by teachers, makes a significant impact on student outcomes (e.g., reduced core and associated symptoms; improved quality of life), and improves teachers' sense of teaching competency. For this study, we are evaluating the sustainability and implementation of the *ASSIST* program.

The purpose of this current study is to 1) determine if a direct-to-consumer commercialization model is a viable way to make the *ASSIST* online program sustainable over time, and 2) examine the factors that affect the reach, uptake, adherence, and effectiveness of *ASSIST*. To answer these questions, we are inviting up to 300 teachers from across Canada to access the program for free and will survey the teachers to learn more about the impact of *ASSIST*. We are also examining how teachers can best learn about the *ASSIST* program. We will compare the effect, access, and uptake of the *ASSIST* program by teachers through different marketing channels (e.g., social media, print, websites, etc.).

**What will I be asked to do?**

After providing consent, you will be asked to complete a series of 6 questionnaires before accessing the *ASSIST* program. These questionnaires will ask questions about you (e.g., age, sex, years of teaching experience, grade being taught, etc.). It will also include questions about how you heard about the *ASSIST* program and factors that impacted your decision to participate. Additional questionnaires will focus on your perception of change in your knowledge, beliefs, skills, implementation practices, teaching competence, stress, and quality of life. The pre-intervention questionnaires will take approximately 20 minutes to complete.

After completing the pre-intervention questionnaires, you will be provided with an access code to the *ASSIST* program and our virtual hub. Should you have any questions or technical difficulties with the program, please contact the researchers at assist@dal.ca.

The *ASSIST* online program consists of six sessions, and each session will take 1-2 weeks to complete (a maximum of 6-8 weeks to complete the entire program). The sessions can be viewed at a time that is convenient for you, although we recommend reviewing it at the beginning of the week and implementing the strategies throughout the week. During each session, you will be asked to watch videos, read helpful information, complete activities, and use different tools. This will take about 1 hour per session.

***ASSIST* Intervention Sessions**

While the content changes depending on the student's disorder, all *ASSIST* modules follow similar session goals:

| Session | Topic Overview |
|---|---|
| Session 1. All About ADHD/ASD/LD | Evidence-based overview of the disorder (ADHD, ASD, or LD); self-care for teachers; team approach |
| Session 2. Taking the First Steps | Framework for the intervention; developing an *ASSIST* Support Plan; learning about the student; home-school communication; special topics |
| Session 3. The Support Plan | Understanding the student; intervention strategies for core symptoms; developing and implementing an intervention plan; special topics |
| Session 4. Adding to the Support Plan | Continue building the *ASSIST* Support Plan by adding Antecedent strategies |

| | |
|---|---|
| Session 5. Additional Needs | Continue building the *ASSIST* Support Plan by including Consequence strategies; outline the students' associated characteristics and provide strategies to help support them; special topics |
| Session 6. Keep Moving Forward | Adapting and modifying the *ASSIST* Support Plan; transition planning; making need changes; assessing further needs |

You will select which module you would like to use. Although *ASSIST* is self-guided, you will be encouraged to access additional support by communicating and collaborating with your school team, and with the student's parents. The program guides you on how to individualize the information for your student. After completing each session, you will have developed an individualized plan for implementation.

In addition, you will also receive a voucher to access our virtual hub when you begin the *ASSIST* program. The virtual hub, *Child LABS (Learning|Attention|Behaviour|Sleep)* was developed from a grant by The Waterloo Foundation with matching funds from Kids Brain Health Network. The research team was awarded this grant to develop a hub that would provide a community for parents, educators, and healthcare providers who are all working to support children with NDDs and sleep disorders. The virtual hub includes downloadable resources, a reference list of helpful websites and books, ongoing webinars, a repository of past webinars, events calendar, and the opportunity to connect with others on topics of interest through moderated discussion boards. In the future, this will also be the storefront for our other eLearning and eHealth programs. For the duration of the current study, you will be able to access bi-weekly webinars on topics relevant to the *ASSIST* program (e.g., ways to modify a reward program, how to use your attention to modify student's behaviours).

Before you begin each session, you will also be asked to record how carefully you reviewed the material from the previous session, what percentage of the recommended strategies you used, and how successful you were at using these strategies. The research team will collect information about how many times you accessed the program, and the length of time you accessed each session. The program also allows you to track the impact of using this program. This information is for your own purposes and is not downloaded for research purposes (rather it is deleted once you complete the program). You will have access to the program until June 30, 2021 if you would like to go back and review the materials after you complete the program.

You will be asked to complete 7 online questionnaires at the end of the 8 week implementation period. The set of questionnaires includes 4 of the same questionnaires you completed before accessing the intervention, and will also include a satisfaction questionnaire, a willingness to pay questionnaire, and an implementation questionnaire. These questionnaires will take approximately 25 minutes to complete. We will also ask you to complete a 6-Month Follow-Up Questionnaire that will be sent to you 6 months after you received access to *ASSIST*, which will be used to assess whether you are continuing to use the strategies from the *ASSIST* program.

**What are the burdens, risks, and potential harms?**

There are no known risks or harms to participants by taking part in this study. It is possible that you may find the time commitment to complete the questionnaires and work through the intervention as burdensome. We have attempted to lessen the burden of participation and make it more convenient by having the study questionnaires online. The ASSIST program is also accessible online through your desktop, laptop, or smartphone. You may contact the research team by email any time you have concerns or questions during your participation at assist@dal.ca.

You will be informed of any new information that may affect your willingness to continue to participate in this study as soon as the information becomes available.

**What are the possible benefits?**

The study may provide no direct benefit to participants. However, the *ASSIST* program is designed to provide teachers with the skills and tools to help them better support their students with NDDs in the classroom. What we learn from this study may help to make evidence-based professional development interventions more widely accessible to teachers. Findings may also be used to increase scale and spread of other virtual education and mental health programs.

**Can I withdraw from the study?**

Your participation in the current study is voluntary and you may withdraw at any time until data analysis begins in June 2021. At this point (i.e., once the data is compiled for data analysis, and analysis is completed) your individual data is no longer separable from the completed analysis. There are no risks involved with withdrawing from this study. If the study is changed in any way that could affect your decision to continue to take part, you will be notified of the changes. You may be asked to sign a new consent form if the study is changed. If you decide to withdraw from the study, please do so by emailing research team at assist@dal.ca.

**Consent Check: True or False**

I may decide NOT to take part in the study -- even after I sign the Consent Form.

☐ True - If True is checked, the following text appears:

✓ Correct! You may stop taking part in the study at any time.

☐ False - If False is checked, the following text appears:

**X** This statement is actually true. You may stop taking part in the study at any time.

If you need additional clarification about this question or would like to discuss this question further, please contact us at assist@dal.ca.

**Will the study cost me anything and, if so, how will I be reimbursed?**

Internet access is required for participation in the study and the costs of accessing the internet while participating in the study will be the participants' responsibility. There are no further costs to participation. Your participation will take place on your own time, in a place that is convenient to you.

**What about possible profit from commercialization of the study results?**

It is possible that the *ASSIST* program may be commercialized in the future. You will not receive payment if this happens.

**How will my privacy be protected?**

All information you provide for this study will be kept confidential. Your name will not be included in any reports or publications based on this research. Only an ID number will be assigned to the questionnaires you complete. Only those individuals directly involved in the data collection will have access to the master list linking your ID number to your name. The master list will be password-protected and stored on a computer on a secure, password-protected server at Dalhousie University. All data collected from this study survey will be collected in a secure database stored on a shared drive at Dalhousie University and only staff immediately involved in the research will have access. All information collected will be kept for a minimum of 5 years after the results have been published in the form of presentations, posters, or journal articles. With your additional consent (below), we may also use quotations from your written responses on the surveys in publications and for marketing purposes; however, they will be de-identified and there will be no reference to you. Please note that since we did not collect the name of your school, school board, or any of your students' names, this information will not be included in any reports. All studies are subject to a potential audit by the IWK Health Centre's Research Ethics Board. Should an audit be conducted, your privacy will continue to be protected to the maximum extent allowable by law.

**Consent Check: True or False**
Please indicate if the following statement is true of false: We may use quotes from the information you provide on the questionnaires.

- □ True – If "true" is checked, the following text appears:
  - ✓ Correct! We may use quotes from the information you provide on the questionnaires, but these would not be identifiable to you. We will only use these if you provide additional consent to do this (you will be asked for this at the end of this consent form).

- □ False – If "false" is checked, the following text appears:
  - **X** This statement is actually true. We may use quotes from the information you provide on the questionnaires, but these would not be identifiable to you. We will only use these if you provide additional consent to do this (you will be asked for this at the end of this consent form).

If you need additional clarification about this question or would like to discuss this question further, please contact us at assist@dal.ca.

**What if I have questions or problems about the study?**

If you have any study questions or concerns about taking part in the study, you may contact the research team by email at assist@dal.ca.

**What are my research rights?**

Completing this Consent Form by clicking the button below indicates that you have understood the information about this research study outlined in this consent form to your satisfaction and that you agree to take part. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time.

A copy of this Consent Form is available for download and printing by clicking the "Download this Participant Consent Form" link.

If you have any questions at any time during or after the study about research in general you may contact the Research Office of the IWK Health Centre at (902) 470-8520, Monday to Friday between 8:00a.m. and 4:00p.m Atlantic Time. If you would you like to speak to the research coordinator about this Consent Form or ask questions about the study before you decide if you want to take part, please email assist@dal.ca. If you would like to speak to the research coordinator via telephone, in your email, please state that you would like to be called and provide your phone number. The research team will contact you by telephone.

**How will I be informed of study results?**

Please indicate below if you would like to receive a summary of the study results by email. If you indicate "Yes", you will receive an overall lay summary of the findings.

Yes _____ No_____

**Future contact**

Please indicate below if you would like and agree to be contacted for future studies by the *ASSIST* research team.

Yes _____ No_____

**Consent**

Study Title: *Evaluation of the sustainability and implementation of the ASSIST online program for teachers of children with neurodevelopmental disorders*

Please click the buttons below to indicate your consent to participate.

I have read the consent form and understand all of the above that is asked of me. I understand the nature of the study and I understand the potential risks/benefits. I understand that I have the right to withdraw from the study at any time without penalty. By selecting the button titled "I agree to participate in this study", you will be providing consent to participate in this research study.

By selecting the button titled "I do not agree to participate in this study", you will not be providing consent to participate in this research study.

☐ I agree to participate in this study
☐ I do not agree to participate in this study

[If I do not agree to participate in this study is selected] It is not mandatory to respond, but we would be interested in knowing why you chose not to participate in this study so that we can consider this for future research:

_____

Do you give permission for your quotes from questionnaires to be used anonymously for research purposes?

☐ I give permission for my quotes to be used for research purposes
☐ I do not give permission for my quotes to be used for research purposes

Do you give permission for your quotes from questionnaires to be used anonymously for marketing purposes?

☐ I give permission for my quotes to be used for marketing purposes
☐ I do not give permission for my quotes to be used for marketing purposes

_____
(Participant electronic signature)

_____
(Participant email address)

_____

(Date signed: Day Month, Year)