

1-1-2021

Self-Efficacy, Motivation, and Academic Success: Learners With ADHD in Online Universities

Kareta Lewin
Walden University

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Walden University

College of Social and Behavioral Sciences

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Kareta Lewin

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Walden University
2021

Abstract

Self-Efficacy, Motivation, and Academic Success: Learners With ADHD in Online

Universities

by

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MSc, Walden University

MSc, Florida International University

BSc, University of the West Indies

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

Walden University

November 2021

Abstract

Research on traditional or brick and mortar universities suggests that there is an association between self-efficacy, intrinsic motivation (IM), extrinsic motivation (EM), and academic success in higher education. What is not yet clear is whether self-efficacy and motivation (IM and EM) are associated with academic success in online universities. The purpose of this study was to examine whether there is an association between self-efficacy, motivation (IM and EM), and academic success for learners with attention deficit hyperactivity disorder (ADHD) who attend online universities. The possible role of self-efficacy in mediating the relationship between IM and EM and academic success was also examined. Bandura's theory of self-efficacy provided the theoretical framework for this study. The survey instrument included demographic questions, grade point average score, and items from the General Self-Efficacy Scale and the Academic Motivation Scale. A convenience sample of 52 students who attended an online university completed the survey anonymously on SurveyMonkey. Regression analysis indicated there were no statistical significance between the variables. Mediation analysis indicated statistical significance between self-efficacy and IM, which is consistent with the literature. However, overall mediation effects were nonsignificant. The findings indicate that other factors such as peer relationships are equally important to consider in the development of learning activities that influence learner engagement, persistence, and academic success. The study's implications for positive social change include informing university staff about strategies to support the retention and academic success of students with ADHD who attend online universities.

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Dedication

I dedicate this dissertation to the memory of my mother, Dottilda Bernard, who instilled in me a love for learning and social justice. I also dedicate this dissertation to the memory of my father, Kensford Jackson, who encouraged me to dream big and to be bold in my pursuit of knowledge. To my husband, Reverend Wayne Lewin, who has been supportive throughout this process, thank you.

To my sons Jesse and Zachary, may you always strive for greatness.

Acknowledgments

I would like to acknowledge my committee, who has provided guidance and moral support throughout my dissertation journey:

To my outstanding chair, Dr. Sharon Xuereb, your stalwart support throughout my dissertation journey was phenomenal! Thank you for your exemplary mentorship and scholarship. I am greatly appreciative of your passion to help your students achieve academic success. I admire your attentiveness and commitment to your students in their learning engagement.

To Dr. Megan Baril, thank you for serving on my committee. Your suggestions and guidance throughout my dissertation journey have helped me to improve the quality and scholarship of my research. Your experience in quantitative research provided a strong foundation on which to grow in my development as a researcher.

To Dr. John Agnew, who anchored my committee so well: Thank you for the honor, respect, and affirmation you conveyed in your feedback. Your timely and thoughtful feedback with guidance, made it possible for me to reach my goal.

I wish to thank my student success advisor, Greg Murphy, the technical support department, and faculty at Walden University for their input and assistance in my pursuit of academic excellence in the field of psychology.

I also wish to acknowledge my spiritual mother, Dr. Juliet Bradford, my sisters, aunts, and friends for their moral support and prayers; thank you for walking this journey with me. To my fellow doctoral candidates, Venice Hilton and Yashica Bailey, who provided me a listening ear when I needed to process my ideas as I developed my study;

you both encouraged me to stay persistent and focused on my goal. Thanks to everyone, I have finished this study amidst much sacrifice and personal challenges.

To my God and Father, I say thanks for inner strength and courage provided by you when I felt like quitting. I borrow a quote from the most widely published book in the world, the Bible, “weeping may endure for a night, but joy comes in the morning.” My joy has come!

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Chapter 1: Introduction to the Study

There is growing interest in attending virtual campuses, as working adults seek to achieve a work/life balance alongside the need to improve their education to stay competitive in today's job market (Kaufman, 2015; Kezar, 2014). These groups of students may be referred to as online learners. Within this group, there is a subset of students who have attention deficit hyperactivity disorder (ADHD). ADHD is a neurocognitive condition that persists throughout the lifespan, and which impacts learners' academic success (Rabinovitz et al., 2016). Learners with ADHD who attend online universities run the risk of aborting their academic success by acquiescing to stressors related to high levels of concentration demands from courses, with which they struggle (Britt, 2015; Proulx, 2007).

A review of the literature indicates an association between self-efficacy, internal motivation (IM), extrinsic motivation (EM), academic success, and high attrition rates among students in online universities (Bandura, 1986; Britt, 2015; Hope, 2015; Radel et al., 2017; York et al., 2015). In their study, Radel et al. (2017) noted that IM describes behaviors of learners who engage in activities that they find inspiring and fulfilling. Radel et al.'s research provided evidence that the behaviors of intrinsically motivated persons were more automatic in response to activities they found rewarding, a finding that was confirmed in Vallerand et al.'s (2009) research on IM and EM. Additionally, Radel et al. suggested that EM explained those behaviors of persons who engaged in activities to achieve a reward, as in successfully completing a degree program.

Radel et al. (2017) also provided evidence to suggest that learners who are extrinsically motivated may initially need to rely on their reflective skills to appreciate the level of work involved to achieve success. A similar perspective is provided by Bandura (1986). In his seminal work on self-efficacy, Bandura (1986) provided evidence that suggests adult learners may persist in educational activities when they have a high self-belief in their ability to succeed. These studies focused on the role self-efficacy and motivation (IM and EM) play in learner achievement in traditional universities. The relationship among these factors may be different for learners with ADHD attending online universities and who struggle with self-efficacy beliefs and motivation.

An analysis of the constructs self-efficacy, motivation, and academic success can extend knowledge of the kinds of adjustments learners with ADHD may need to make to achieve academic success in online universities (Hwang et al., 2018; Kuh et al., 2006; Salvo et al., 2019; York et al., 2015). This knowledge may further understanding of causes for high attrition rates at online universities, specifically within the sub-population of online learners with ADHD. This population has not been adequately examined in the literature, according to my research.

In this chapter, I provide a synopsis of the current study, including a rationale for the focus of the research. Additionally, I provide background information on the research topic, state the problem and purpose of the study, present the research questions (RQs) and hypotheses, discuss the theoretical framework and nature of the study, and define key terms. The assumptions, scope and delimitations, limitations, and significance of the study are also discussed. The chapter concludes with a summary of salient points.

Background

To understand the value of exploring the experience of learners with ADHD in online universities, it is important to define the disorder. The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., *DSM-5*; American Psychiatric Association [APA], 2013) describes ADHD or attention deficit hyperactivity disorder as a neurological disorder that impairs executive functioning. Research shows that the presentation of ADHD persists throughout an individual's lifespan (Barnard, Pellow, & Solomon, 2011; Zeeuw et al., 2017). Symptoms of this disorder include high distractibility, poor motor control, and inattentiveness (APA, 2013); these symptoms contribute to learning deficits. The persistent nature of ADHD symptoms was confirmed in a study by Leung and Lemay (2003), who found that children with an ADHD diagnosis continued to struggle with distractibility and poor organizational skills into adulthood, and that this lack of skill development has an impact on self-regulated learning activities, the hallmark of all online university classes (Park & Yun, 2017; Serin, 2018).

From a neurocognitive perspective, ADHD symptoms have an impact on an individual's ability to correctly use good judgment to arrive at concrete conclusions (Ahmann et al., 2017; Jonides, 2008; Major et al., 2013; Proulx, 2007). Compromised executive functioning affects learners' ability to apply strong critical thought to academic activities, which gets increasingly challenging by the time learners with an ADHD diagnosis arrive at university. Furthermore, learners with ADHD have increased struggles with learning when they pursue higher education (Richards, 2016), especially in online universities where learning requires strong mental effort (Huang-Pollock & Karalunas,

2010; Rabinovitz et al., 2016; Richards, 2016). As an example, Walden University, a major online university, reported that approximately 15% of its learners who were currently registered at the Office of Disability Services were identified as having an ADHD diagnosis (Roney, 2020). Understanding how an impaired cognitive system impacts learners in online universities may assist university staff in enhancing the online support they provide for learners with ADHD symptoms.

Cognition is an important aspect of attentiveness and influences a person's self-efficacy and motivation in their learning (Bless et al., 2013). As a result of their neurological disorder, learners with ADHD often struggle with self-efficacy, motivation, and academic success in their pursuit of higher education (Huang-Pollock & Karalunas, 2010; Rabinovitz et al., 2016; Richards, 2016). The prescription drugs that provide the primary treatment of ADHD symptoms do not specifically address the root cause of learners' cognitive challenges, research shows (Advokat et al. 2011; Advokat & Scheithauer, 2013). The research examined thus far suggests that cognitive challenges affect the self-efficacy and motivational beliefs of learners with ADHD, which, in turn, affects their academic success.

Studies on the phenomena of self-efficacy, motivation, and academic success show the importance of learner persistence, engagement, and positive self-beliefs in the pursuit of higher knowledge and postsecondary degrees (Salvo et al., 2019; York et al., 2015). The exploration of how self-efficacy and motivation (IM and EM) impact academic success of learners with ADHD in online universities is important given that these variables may function differently in learners who have an ADHD diagnosis. As

evidenced in the literature, learners with ADHD struggle with impairments in the cognitive domain which makes it challenging for them to sustain high concentration required for robust academic studies in higher education (Baddeley, 2012; Richards, 2016). Such learners who are struggling with meeting academic requirements may contribute to the high attrition rates being experienced by online universities (Britt, 2015; Hope, 2015). Findings may help online university communities to improve delivery systems of instruction, student engagement, technical support, and other student services to increase academic success for these learners (Kaufman, 2015).

Online learners are receiving more attention in research studies as the phenomenon of online learning is fast becoming a worldwide norm (Kaufman, 2015; Kahu, 2015; Kezar, 2014; Serin, 2018). Indeed, studies show that learners are increasingly enrolling at online universities to pursue higher education because these institutions provide a good fit for their busy work, family, and social life (Brown, 2017; Hope, 2015; Kaufman, 2015; Serin, 2018; Stavredes, 2011). In her research study, Kaufman (2015) reported an increase of over 6.5 million students enrolled in an online course within the previous 10 years. In fact, over 30% of higher education students were reported as taking at least one online course, according to the Babson Survey Research Group (Allen & Seaman, 2013). Not surprisingly, researchers have examined self-efficacy to understand its role in learners' academic success in both traditional and online learning settings (Brown, 2017; Hope, 2015; Walters & Hoops, 2015).

There is supportive evidence in research indicating a positive association between self-efficacy, motivation (IM and EM), and academic success (Dousay, 2016; Farmer et

al., 2015; Kaufman, 2015; Usher et al., 2019). These studies focused on the general college learner population, primarily those who attended traditional universities. The researchers noted the higher level of interaction between the instructor and students on the one hand and a higher peer to peer contact on the other. Higher levels of interaction appear to play an important role in the way learners engage and persist in their studies (Lu & Wan, 2018; Serin, 2018; Svinicki & McKeachie, 2014). What is not yet known is whether those associations also hold true for learners with ADHD in online universities. An examination of how these factors may predict academic success in learners with ADHD may help to better understand barriers to academic success for this population. Identifying factors that impede or enhance academic success is of paramount importance considering the growing interest by learners to fulfill advanced learning opportunities in online universities.

Self-efficacy has received much attention in research to understand its role in learners' academic success in both traditional and online learning settings (Brown, 2017; Hope, 2015; Walters & Hoops, 2015). In a study examining self-efficacy across different cultures and geographical locations, de Oliveira, Hauck-Filho and Garcia-Dias (2016) found that the definition of self-efficacy varied among study participants with an ADHD diagnosis and those who did not. Based on their findings, one of the study's conclusions is that learners need to have a comprehensive understanding of academic challenges unique to online universities, which may then help their understanding of what self-efficacy and motivation (IM and EM) mean in an academic context.

Further focusing on the critical role self-efficacy plays in achieving academic success in online universities, Kwon, Kim, and Kwak (2018) conducted research with college student participants to assess, from participants' perspective, what their experiences were like in attending higher education with an ADHD diagnosis. The authors reported an age range of 22-29 years for participants in their research. They found that learners with ADHD exhibited dysregulated behaviors, lower self-esteem, and less successful peer interactions (Kwon et al., 2018); these are factors which contribute to low self-efficacy (Bandura, 1986). Moreover, the study also emphasized the negative influence of poor organization skills on academic success, a characteristic with which learners with ADHD are known to struggle (Kwon et al., 2018). It could be argued that self-efficacy plays an important role in the achievement of academic success in online universities.

While numerous researchers have examined the association of self-efficacy with academic success (Brown, 2017; Kwon et al., 2018), other studies have also examined the predictive factors of motivation (IM and EM) on academic success. The seminal work of Deci and Ryan (1991) found a strong association between IM, EM, and academic success in learners. In fact, IM and EM have been found to be highly associated with learner persistence, focus, and achievement capacities (Bruno, 2013; Serin, 2018; Usher, Li, Butz, & Rojas, 2019). Further research by Radel, Pelletier, and Cheval (2017) on IM and EM found that learners' response to educational activities varied, depending on their locus of control, a term which explains learners' attitude towards their own responsibility to achieve academic success (Ambrose et al., 2010). These findings suggest that

motivational behaviors were associated with learners' level of cognition processing which impacted their comprehension and subsequent learning (Radel et al., 2017).

Further scrutiny on the role IM and EM play in the attainment of academic success by learners with ADHD by researchers show there may be unique challenges faced by this learner population in earning a degree. Research by DuPaul and Jimerson (2014) found that learners with ADHD experienced challenges associated with reading comprehension which impacted their analytic, reflective, and summative skills. DuPaul et al. (2017) also reported that learners with ADHD exhibited lower performance levels than their counterparts without the disorder. Lower skill levels in these areas that are critical to self-regulated learning may in fact, particularly affect motivation (IM and EM) for these learners in online universities (Farmer et al., 2015).

These studies point to the importance of examining the association of motivation (IM and EM) with academic success for learners in online universities with ADHD. Motivation (IM and EM) highlight challenges with learning behavioral patterns which learners with ADHD struggle with, and which may affect their persistence in academic success. Furthermore, studies examined highlight the need to better understand the contributing role of IM and EM with regards to achieving academic success for learners with ADHD in online universities. An understanding of the role of motivation on academic success may shed light on how online universities may provide and enhance support systems to foster positive learning behaviors for learners with ADHD to support their academic success (Kizilcec et al., 2017; Winne & Hadwin, 2010; Zimmerman, 2000).

Providers of education and educators alike are concerned about students' academic success as it indicates how well a student performed in a course or a program of study (Hwang et al., 2018; Salvo et al., 2019; York et al., 2015). Research supports concerns for students experience of learning in an online setting which influences their level of engagement and persistence (Hwang et al., 2018; Kuh et al., 2006; Salvo et al., 2019; York et al., 2015). In online universities, interaction primarily occurs asynchronously via a learning platform system, such as Moodle (Aljaser, 2019) which impact focus and persistent behaviors. Hwang et al. (2018) found in their study that the need to learn how to navigate online technologies, as well as learning how to manage course work and balance life-related roles, were additional reasons online learners were at risk for academic failure. Indeed, the researchers highlighted those learners who achieved academic success were those who exhibited a higher level of persistence or "grit" (p.708). Many online learners are also new to self-regulated learning and may face challenges navigating this platform in the first two years which are critical to academic success and persistence (Hwang et al., 2015). As such, many exit in a mass exodus in response to the unfamiliar demands of self-regulated learning (Britt, 2015; Hwang et al., 2015).

Finding ways to keep learners engaged, motivated, persistent, and with high self-efficacy is the focus of many research studies in the educational domain (York et al., 2015). However, these studies have not focused on the unique challenges in which ADHD diagnosis presents in online learners. For example, some of the unique challenges online learners with ADHD exhibit include disorganized study habits, poor time

optimization skills, poor study skills, and low social support systems which decrease their potential for academic success in online universities (Du Paul et al., 2017; Ergun & Avcı, 2018; Hwang et al., 2018). It is therefore important to examine the role self-efficacy and motivation (IM and EM) have on academic success for this sub-population of learners in online universities to guide decisions to support their learning.

Problem Statement

Studies on online learning show that self-efficacy and motivation are key characteristics to engender successful academic performance (Dousay, 2016; Kaufman, 2015; Major, Martinussen, & Wiener, 2013; Stavredes, 2011). The terms self-efficacy, motivation, and academic success are defined here. For this study, self-efficacy refers to the belief a person has in him or herself to successfully perform a given task or activity (Bandura, 1977). The construct- academic success- is defined as an amalgamation of academic achievement and obtainment of learning objectives (York et al., 2015). This construct is measured most often by the student's grade and overall GPA score (Hwang, Lim, & Ha, 2018; Kuh et al., 2006; Salvo, Shelton, & Welch, 2019; York et al., 2015). Consistent with previous studies, students' overall GPA score will be used to measure their academic success. Motivation is defined as one's "willingness to build desire to learn through engaging in activities" (Serin, 2018, p. 191).

Motivation is also described as the desire to succeed in each task or activity (Ambrose et al., 2010). Motivation (IM and EM) is presented as a two-fold concept in the research literature (Serin, 2018; Vallerand et al., 1992) with research providing evidence of its' influence on learning behaviors (Muro, Soler, Cebolla, & Cladellas, 2018; Radel,

Pelletier, Pjevac, & Cheval, 2017; Zajacova, Lynch, & Espenshade, 2005). Each type of motivation (IM and EM) impacts learning in a different way, creating different academic outcomes (Maulana, Opdenakker, & Bosker, 2014; Radel et al., 2017; Serin, 2018; Vallerand, 2009). For example, learners who are externally motivated rely on rewards and praise to persist in their engagement efforts, while learners who are internally motivated find within themselves the inner drive to succeed (Radel et al., 2017; Serin, 2018). An understanding of how self-efficacy and motivation (IM and EM) impact academic success of online learners with ADHD is important, as a review of the literature provides evidence showing low self-efficacy and low motivation (IM and EM) translate into low academic success (Ambrose et al., 2010; Fleming & Wated, 2016; Maulana et al., 2014; Muro et al., 2018; Kwon et al., 2018; Stavredes, 2011).

As previously mentioned, learners with ADHD find higher education to be a challenging experience due to deficits experienced in their cognitive process system (Baddeley, 2007; duPaul & Jimerson, 2014; Richards, 2016; Tannock, 1998; Zanfonte & Parks-Stamm, 2016). Furthermore, learners with ADHD have also been found to have lower levels of self-efficacy and motivation (IM and EM) compared to those without an ADHD diagnosis (Oberauer & Lewandowsky, 2014; Radel et al., 2017), and as the research suggests, self-efficacy and motivation (IM and EM) are two key criteria for successful student engagement. Strong self-efficacy, strong motivation (IM and EM), and strong self-discipline skills help students achieve success in higher education (duPaul et al., 2017; Johnson & Stage, 2018; Radel, Pelletier, Pjevac, & Cheval, 2017; Richards, 2016; Zanfonte & Parks-Stamm, 2016). However, these are skill sets those learners with

ADHD struggle with, and therefore, this population of learners in online universities may also have poor academic success because of these challenges (Kizilcec et al., 2017; Kuh et al., 2006; Serin, 2018).

The role of self-efficacy and motivation (IM and EM) as predictors of academic success for learners is widely researched in traditional learning environments (Farmer et al., 2015; Zuffiano et al., 2013). These studies found that people who exhibit high self-efficacy tend to be more motivated in completing a task or activity, be it academic or non-academic (Radel et al., 2017; Zajacova, 2005). There are studies which have researched motivation in the context of how knowledge is given and received in online universities, what factors drive motivational behaviors, what factors impact self-efficacy, and factors which impact academic success in online universities (Ergun and Avci, 2018; Hwang et al., 2018; Park & Yun, 2017). However, no study has been conducted looking at these variables focusing on learners with ADHD in online learning environments. Indeed, current research has not yet established whether the relationship between self-efficacy, motivation (IM and EM), and academic success may be different for learners with ADHD who study in online universities (deOliveira, Hauck- Filho, & Garcia- Dias, 2016) compared to learners at traditional universities where the focus of learning is centered on lectures and group activities (Akhtar, Tatlah, & Iqbal, 2018; Johnson & Stage, 2018; Stavredes, 2011; Svinicki & McKeachie, 2014). In traditional universities, for example, learners have a higher degree of interaction with their instructors and peers through group discussions which facilitate greater learning opportunities, and which enhance the learning experience (Johnson & Stage, 2018; Svinicki & McKeachie, 2014).

In contrast, for online universities, the focus of learning is more independent, as evidenced in the research study of Kizilcec et al. (2017). Furthermore, it has been found that self-efficacy and motivation (IM and EM) may impact success in independent learning programs, as indicated in other research (deOliveira et al., 2016; Kizilcec et al., 2017; Stavredes, 2011). Independent or self-regulated learning requires higher self-efficacy and higher persistence factors to achieve academic success (Hwang et al., 2017; Kizilcec et al., 2017). Finally, the research suggests that learners whose locus of control is internal and thereby exhibit high IM have a higher propensity to succeed over their counterparts with an external locus of control and subsequent EM (Stavredes, 2011). Therefore, examining how these variables interact with learners with ADHD in online universities may provide an opportunity to identify learning strategies which may help those learners exhibit higher self-efficacy and motivational behaviors which contribute to academic success.

My study also addressed whether self-efficacy mediates the relationship between motivation (IM and EM) and academic success. Performing a mediation analysis is also a unique contribution in this study to the current literature, as self-efficacy has not been used before as a mediating variable between motivation and academic success. Research supports the use of self-efficacy as a mediator variable in this context, from the work of Bandura (1977) which indicates that self-efficacy is a major factor in the directional flow of learning. Other research also confirms that self-efficacy influences the ways in which individuals behave (Bandura, 1977; Unsworth & Mason, 2012). Moreover, research shows that students with high self-efficacy tend to show high motivation behaviors to

achieve their goals (Zajacova et al., 2005). Conversely, low self-efficacy is associated with low motivation behaviors (Fleming & Wated, 2016). To the best of my knowledge, this study also fills in a gap in the literature by testing the mediating role of self-efficacy in the relationship between motivation (IM and EM) and academic success for online learners with ADHD.

To summarize, students at online universities are rigorously assessed in their course work, and there is a heavy emphasis on self-regulated learning which require high levels of concentration (Blasiman, Larabee & Fabry, 2018; Richards, 2016; Stavredes, 2011; Zeeuw et al., 2017). ADHD is characterized by inattentiveness and concentration dysfunction which may interfere with these learners' academic success (Baddeley, 2012; Bless et al., 2013). Understanding the association between self-efficacy, motivation (IM and EM) and academic success of learners with ADHD is critical to help develop policies and instructional strategies which support self-directed learning and academic success for them in online universities (Britt, 2015; Hope, 2015; Kaufman, 2015).

Purpose of the Study

The purpose of this study was to determine the relative strength of self-efficacy and motivation in predicting academic success in learners with ADHD at online universities. In addition, I examined the process through which these variables are linked, specifically, whether self-efficacy mediates the relationship between motivation (IM and EM) and academic success. Self-efficacy is being examined as the mediator variable between motivation (IM and EM) and academic success, as self-efficacy is

known to be a major driver in learner engagement, learner persistence, and academic success (Bandura, 1977; Bandura, 1986; Usher et al., 2018).

The results of the study provide evidence of a direct association between ADHD symptoms and academic success. Research confirms an association between the presence of ADHD symptoms and low academic success in a population of primary school age twin children in the Netherlands (de Zeeuw et al., 2017). Other research also provides evidence of the impact the environment in which learning takes place has on learners' self-efficacy and motivational behaviors to achieve academic success (Zeeuw et al., 2017; Ergun & Avci, 2018; Kaufman, 2015; Serin, 2018; Stavredes, 2011).

An implication of this research is that an understanding of the role of self-efficacy and motivation (IM and EM) in learners with ADHD at online universities may help faculty staff to develop instructional activities that engender strong learning engagement, learning outcomes, and overall academic success for this learner population. From the online adult learner perspective, an understanding of how these variables may be related to their academic success may lead to the adoption of various academic skills to support their learning. These activities might include obtaining individual coaching, guidance on time management, and organizational skills that maximize their individual success in an online learning environment.

Research Questions and Hypotheses

The RQs and their corresponding hypotheses are as follows:

RQ1: To what extent is there an association between self-efficacy, as measured by the General Self-Efficacy Scale, and academic success as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀1: Self-efficacy, as measured by the General Self-Efficacy Scale, is not a significant predictor of academic success, as measured by self-reported overall GPA, in adult online learners with ADHD.

H₁1: Self-efficacy, as measured by the General Self-Efficacy Scale, is a significant predictor of academic success, as measured by self-reported overall GPA, in adult online learners with ADHD.

RQ2: To what extent is there an association between academic intrinsic motivation, as measured by the Academic Motivation Scale, and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀2: Academic intrinsic motivation is not a significant predictor of academic success in adult online learners with ADHD.

H₁2: Academic intrinsic motivation is a significant predictor of academic success in adult online learners with ADHD.

RQ3: To what extent is there an association between academic extrinsic motivation, as measured by the Academic Motivation Scale, and academic success as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀3: Academic extrinsic motivation is not a significant predictor of academic success in adult online learners with ADHD.

*H*₁₃: Academic extrinsic motivation is a significant predictor of academic success in adult online learners with ADHD.

RQ4: To what extent does self-efficacy mediate the association between academic intrinsic motivation and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

*H*₀₄: Self-efficacy does not mediate the relationship between academic intrinsic motivation and academic success in adult online learners with ADHD

*H*₁₄: Self-efficacy does mediate the relationship between academic intrinsic motivation and academic success in adult online learners with ADHD.

RQ5: To what extent does self-efficacy mediate the relationship between academic extrinsic motivation and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

*H*₀₅: Self-efficacy does not mediate the relationship between academic extrinsic motivation and academic success in adult online learners with ADHD.

*H*₁₅: Self-efficacy does mediate the relationship between academic extrinsic motivation and academic success in adult online learners with ADHD.

Theoretical Framework

The theoretical framework for this study consisted of Bandura's (1977) theory on self-efficacy and Fleming and Wated's (2016) work on learners with ADHD in higher education. Bandura's theory of self-efficacy posits that individuals' perception of their ability to perform a task influence their behaviors towards task initiation and completion. According to Bandura, self-efficacy describes the perception individuals have regarding

their ability to achieve a desired goal (e.g., pass a test). In academic settings, self-efficacy has been shown to have high predictive associations with academic success (Zajacova et al., 2005). Thus, if self-efficacy is low, performance will be low (Bandura, 1977).

Conversely, if self-efficacy is high, performance will be high (Bandura, 1986; Fleming & Wated, 2016). It could be argued that research supports the notion that self-efficacy is a strong determinant of how well learners with ADHD may perform in online universities, based on their perceptions of themselves and their abilities (Bandura, 1977, 1986).

Findings in the research, for example, point to concerns of how faulty executive systems impact the way knowledge is received, analyzed, processed, organized, and retrieved (Huang-Pollock & Karalunas, 2010; Jarratt, 2015; Zenon et al., 2008). This concern is amplified for learners with ADHD who struggle with impairment in their cognitive domains. Learners who already struggle with low self-efficacy beliefs may exhibit less persistence with constant negative feedback about their work and decide to discontinue their aspirations of attaining a degree in higher education (Hwang et al., 2017; Usher et al., 2018).

Furthermore, learners with ADHD who struggle with cognitive dissonance may view self-assessments in conflicting ways, which in turn, may impact self-efficacy and motivation (IM and EM) towards academic success (Fleming & Wated, 2016). For example, low self-efficacy beliefs may present in low motivation (IM and EM) behaviors (Fleming & Wated, 2016). The philosophy of learning that directly impacts learners with ADHD may be linked to instructional strategies that do not take into consideration the learning challenges of this learner population (Baddeley, 2012). For these reasons, I

concluded that Bandura's (1977) theory of self-efficacy provided an appropriate framework for understanding academic success achievement for learners with ADHD at online universities.

Nature of the Study

The nature of this study was quantitative, using a nonexperimental correlational design. This approach is appropriate for predicting associations between several variables simultaneously (Frankfort-Nachmias & Leon-Guerrero, 2015; Warner, 2013). By using this type of quantitative design, I was able to examine whether an association exists between self-efficacy, motivation (IM and EM), and academic success in online learners with ADHD. I performed regression analysis to examine the association between the study's variables. The independent variables were self-efficacy and motivation (intrinsic and extrinsic); the dependent variable was academic success. To stay true to a nonexperimental design, variables were manipulated. In addition, mediation analysis was conducted, using self-efficacy as the mediator between motivation (IM and EM) and academic success. In Chapter 3, I provide a comprehensive discussion of the research design.

I obtained data from participants enrolled in an online degree university program and pursuing a bachelor's or master's degree. Doctoral degree students were beyond the scope of this study. The General Self-Efficacy Scale was used to measure students' general self-efficacy; the scale was developed by Schwarzer and Jerusalem (1995). I used the Academic Motivation Scale (AMS) cited in Vallerand et al. (1992) to measure intrinsic and extrinsic motivation specifically related to academic pursuits. In addition, I

used students' self-reported overall GPA scores at an online university to measure the academic success of learners with ADHD (see Zajacova et al., 2005).

I used SurveyMonkey to collect data. In the survey, participants were asked to self-report whether they had an ADHD diagnosis. Multiple regression analysis was used to analyze RQs 1-3. Mediation analysis was used to answer RQs 4 and 5. The overarching goal of the research was to understand the significance of the association between self-efficacy, motivation (IM and EM), and academic success for learners in online universities. An understanding of the association between the variables could strengthen future efforts by online university leaders to identify strategies to better engage learners with ADHD that enhance their learning and academic success.

Definitions

The following terms are used throughout the capstone paper which are defined here.

Academic success: An individual's successful achievement of established learning goals and objectives of a course and/or program of study (York et al., 2015).

Learner: Someone who has entered college or university to pursue a postsecondary degree. Unless otherwise stated, the age for this population is 18 years and older (see Stavredes, 2011).

Motivation: The desire to complete a task; this desire may be inwardly or outwardly influenced (Deci & Ryan, 1985; Vallerand et al., 1992).

Online universities: Colleges and universities that offer courses partially or fully online (Kaufman, 2015).

Self-directed learning: Learning in which individuals are largely responsible for their own learning as facilitated by an instructor (Ambrose et al., 2010).

Self-efficacy: Belief in one's ability to complete a given task (Bandura, 1977, 1986).

Traditional learning: Learning which takes place in brick and mortar colleges and universities (Zuffiano et al., 2013).

Assumptions

In this study, I had several assumptions. I assumed that students with ADHD would be happy to take part in the study and not want to disassociate from the study for fear of getting labeled. I used convenience sampling to recruit the sample. Participants were pursuing a bachelor's or master's degree. Finally, I assumed that self-reported GPA scores were a robust measure of academic success in the study; I had this assumption because this is how previous researchers have measured academic success (York et al., 2015). Moreover, I assumed that participants would know and accurately self-report their GPA scores and would answer the other questions honestly, especially because the survey was conducted anonymously.

Scope and Delimitations

The scope of this study was limited to learners with ADHD in online universities in a bachelor's level or master's level degree program. In this study, the term *learners* refers to those who are aged 18 years and older. Doctoral-seeking adult learners were beyond the scope of this study. For this reason, findings from this study will not apply to learners in traditional universities or to doctoral students in traditional and online

universities. Moreover, findings do not apply to learners who are pursuing other types of courses and programs, such as certificate and associate degree programs in online universities. Finally, findings do not apply to learners with learning disorders other than ADHD.

Limitations

There are several limitations to this study based on its design, data collection strategies, and use of convenience sampling. Primarily, participants self-reported their medical diagnosis of ADHD. Secondly, I assumed that students who self-reported a diagnosis of ADHD and were taking a stimulant were honest in their report. Another limitation to the study is that I did not collect any data on the type and nature of the ADHD diagnosis to provide specificity regarding the severity of the disorder. Inferences made should be used with caution, and findings from this study should not be generalized to the broader population in online universities (see Babbie, 2017; Burkholder et al., 2016). Furthermore, understanding of the findings should be within the parameters of the measures used, the variables tested, and the sample population used to obtain data (Babbie, 2017; Burkholder et al., 2016).

Significance

The risk of academic failure is a real one for learners with ADHD (de Zeeuw et al., 2017). I conducted this study to address a gap in understanding whether an association exists between self-efficacy, motivation (IM and EM), and academic success of learners with ADHD who study in online universities, and whether self-efficacy mediates the relationship between motivation (IM and EM) and academic success for

learners in online universities. Research on the process linking self- efficacy, motivation (IM and EM), and academic success for these learners may contribute to discussions on ways that support student achievement and overall academic success for learners with ADHD (Johnson & Stage, 2018). The results from this study could also be used to improve instructional strategies to positively impact learners' self-efficacy, motivation behaviors, and engagement strategies (Britt, 2015; Farmer et al., 2015; Liang et al., 2018; Wolters & Hussain, 2015). Moreover, more emphasis on instructional design, instructional strategies, engagement activities, and social network-building skills in e-learning communities by online university administrators may also lead to increased academic success for learners with ADHD who are pursuing higher education (Aljaser, 2018; Kaufman, 2015; Usher et al., 2017).

The findings from this research study may also directly benefit online learners with ADHD in that they may receive targeted guidance to take advantage of various support services offered by their institution to enhance their learning and study skills. Equally important, the study may clarify the type of relationships needed to support academic success in online universities between instructors and learners as research strongly confirms the important role instructors play in student achievement (Kaufman, 2015; Tasgin & Coskun, 2018). Positive social change may occur from an institutional perspective and in terms of student centeredness.

Other implications for positive social change highlighted in this study include improvement in regulatory policies at the institutional level focused on the quality of student success in academic pursuits. For example, regulatory policies regarding the

orientation process to online learning and accessing disability services could potentially be adjusted in ways to better support these students' academic goals. As an example, administrators could require students to attend a mandatory webinar within the first quarter/semester that provides instruction on ways to develop their critical thinking and reflective thinking skills to support their academic success. Disability services may also be offered to support student success. A positive impact of social change at the systemic institutional level may be experienced if institutional leaders apply results from the study to improving the instructional design and delivery process of instruction to learners in online universities. This may especially benefit those with ADHD symptomologies. Such efforts may lead to engendering positive self-efficacy and motivation for this population of learners (Zuffiano et al., 2013).

Further, as a vehicle for positive social change, the knowledge from this study may potentially inform student enrollment practices to improve the initiation process to online learning. For example, online learners in need of extra services could be more easily identified and referred to student services to support their success. This could be achieved by including in orientation materials opportunities that are available to learners with ADHD who may then seek out those services accordingly. Additionally, in this study, I describe engagement strategies and self-regulated learning skills for learners with ADHD, which, research shows, may lead to improved academic success (Rogowsky et al., 2015; Wolters & Hussain, 2015). Finally, this research may help online learners with ADHD increase their understanding of how they can take better control of their learning to achieving academic success.

Summary

In this chapter, I provided an overview of the study that included background information on the study topic and the rationale for examining the role of self-efficacy and intrinsic and extrinsic motivation in academic success of online adult learners with ADHD. In addition, I introduced the purpose of the study and stated the gap in the literature that the research study addressed, including significance of the findings. Chapter 1 includes definitions of common terms used throughout the study to better facilitate reader comprehension. The scope of this research was limited to learners with ADHD in online universities who struggle with academic success. Limitations to the study were also outlined in this chapter to provide guidance on how to appropriately use findings. Chapter 2 will consist of a comprehensive literature review of the extant literature.

Chapter 2: Literature Review

Introduction

According to the *DSM-5* (APA, 2013), ADHD is diagnosable as early as 6 years old and may persist into adulthood (Rabinovitz et al., 2016). Impairments related to the disorder include high distractibility, poor time management, poor organization skills, and delayed mental processes (APA, 2013; Zeeuw et al., 2017); these are important skill sets necessary for achieving academic success in online universities. An understanding of ADHD and its impact on the learning behaviors of adults who have this diagnosis is important. Focus on this population as they pursue tertiary education in online universities was an important consideration which guided this study as the research literature suggests that studying in online universities requires strong mental reasoning and rigorous self-discipline. The condition of ADHD presents unique challenges to success for the target population, and rigorous study is required to determine modalities of success for this group (Baddeley, 2012; Bless et al., 2013; Dagry et al., 2016; Rabinovitz et al., 2016; Richards, 2016).

This study was also important as the research literature suggests that little scientific research and reporting has been done on this learner population attending online universities. To fully understand how online learning may impact learners with ADHD, I will explain the presentation of its symptomologies by discussing key literature (DeOliveira et al., 2016; Rabinovitz et al., 2016 Zeeuw et al., 2017). *Learners* in this chapter refer to students 18 years old and beyond, unless otherwise stated. In the chapter, I discuss the literature search strategy and theoretical foundation underpinning the

research, review the literature, and discuss the methodology for this study. Key variables specific to the research study are expounded; these include self-efficacy, motivation (intrinsic and extrinsic), academic success, and ADHD. The chapter concludes with a summary of key findings that establishes the study's relevance.

Literature Search Strategy

Peer-reviewed articles primarily formed the basis of this literature review. I sourced these articles from the following databases: PsycARTICLE, PsycINFO, SAGE, ProQuest Central, and EBSCOhost Academic Search Complete; primary authorships were additional sources for information. I used the following key search terms for the literature review: *attention deficit hyperactivity disorder*, *attention deficit hyperactivity disorder and working memory*, *academic achievement*, *academic success*, *motivation*, *intrinsic and extrinsic motivation*, *self-efficacy*, *distance learning*, and *online learning*. Both seminal and current studies are included in the review to provide a comprehensive overview of the factors that may affect online university learners who are diagnosed with ADHD.

Theoretical Foundation

Bandura (1977) developed the theory of self-efficacy, which was the primary theory for this research. According to Bandura (1977, 1986) self-efficacy is the belief a persons have in their ability to engage in and complete a specific task or goal. An example of this would be a person believing that they can research a topic and present data in a comprehensive way, in accordance with preset academic rubrics. Self-efficacy is thus one of the many psychological constructs commonly used to predict academic

success (Usher et al., 2018). Bandura (1977) argued that people have an innate desire to succeed and will generally gravitate to activities that present the lowest risk of failure. This rationale suggests that learners with high self-efficacy will apply the necessary mental strength and effort to a task to produce high achievement, while learners with low self-efficacy will apply low effort to complete the same task will produce low effort and therefore produce low achievement.

Bandura (1977) offered the tenet that self-efficacy is impacted by a person's psychosocial environment, including factors such as interrelationships, state of wellbeing, life altering experiences, and life pursuits (Bandura, 1977, 1997). As an example, a learner surrounded by other successful learners whose behaviors demonstrate the ability and capacity to successfully complete a task or achieve a desired outcome, may in turn, develop an inner confidence and demonstrate mastery of a similar task (Bandura, 1977). In some shared learning experiences therefore, it is possible that a learner with high self-efficacy might influence a learner with low self-efficacy, to the extent that confidence in their own ability to get a task done would improve by this association to produce work at a higher level. This rationale is supported by a study done by Nelson and Clark (2015), who found that learners who increased their self-efficacy evidenced higher persistence and motivational levels.

Another tenet postulated by Bandura (1977) on self-efficacy is that when individuals exhibit a positive state of well-being, their cognitive outlook will also be positive. This, in turn, will impact their belief system to be successful in pursuit of the task completion or goal attainment. Socioecological issues, including, for example,

technology, living transitions, work schedules, and finances can induce cognitive distress in learners (Kaufman, 2015; Zajacova et al., 2005). When this happens, learners' emotional state of well-being is compromised, leading to faulty perceptions and poor judgment (Bless et al., 2013; Hasler et al., 2016; Self et al., 2019). These life-altering issues may either be perceived in a positive or negative way. Learners who view these factors in a positive way, which indicates high self-efficacy, would see them as challenges to be surmounted; when perceived in a negative way, indicating low self-efficacy, such issues are viewed as threatening to the learners' ability to be successful (Bandura, 1977; 1986). Depending on how those issues that impact well-being are perceived, will determine the learning posture taken, resulting in either a flight (low self-efficacy) response or fight (high self-efficacy) response.

Life-altering experiences can also impact self-efficacy in a positive or negative way. These experiences have sizable impacts, which may change the trajectory of a person's belief system where they either gain momentum in their pursuits or disengage from the process of goal attainment indefinitely. Examples of life-altering experiences include loss of a loved one, marriage, termination from employment, starting a new career, and starting a family (Farmer et al., 2015). These experiences can potentially induce psychological stress in the life of learners. When this happens, learners may perceive themselves as lacking the ability to perform a task, evidencing low self-efficacy via "flight mode." In a study on nontraditional college students which reported a mean sample age of 20 years for participants, who attended school part-time, and were financially independent, Zajacova et al. (2005) found that learners who perceived that

their stress level was interfering with their productivity could and did terminate their academic pursuit prematurely. Such an outcome is a departure from what Bandura (1977) termed *persistence* and what Usher et al. (2019) referred to as *perseverance* or *grit* in the face of adversity. Both these traits have been found to be essential for achieving academic success (Bandura, 1977; Usher et al. 2019).

According to Bandura's theory (1977) to achieve success in one's personal life, a person must possess high self-efficacy or a strong belief in their ability to maximize success in their environment; in this case, the environment is academic. Bandura (1977) purports that a learner's self-efficacy influences the decisions they may make. Therefore, if a person strongly believes that they will perform well on a task, for example a research paper, they will evidence high self-efficacy; for a person who doubts their ability to perform well at a task, low self-efficacy will be evidenced. This is especially true when learners perceive the task as achievable in the time and effort estimated for accomplishment (Bandura, 1977; Usher et al., 2019; Zajacova et al., 2005). These research studies also suggest that when learners combine learning and coping strategies in their learning management, they will enjoy a high level of self-efficacy and high academic success (Zajacova et al., 2005). This has implications for how learners with ADHD challenges view the learning process and apply themselves to their studies, as they struggle with time management, coping, and study skills that support academic success (DeOliveira et al., 2019).

Literature Review of Key Variables in Study

Self-Efficacy and Adult Learners

From an academic paradigm, self-efficacy explains the persistent belief learners have in themselves to achieve their academic goals. In a study on college students, Walters and Hoop (2015) found that learners who displayed high self-efficacy tended to have higher academic scores. Moreover, learners who exhibited high self-efficacy also demonstrated goal-oriented skills to enable them to achieve their academic goals and objectives. These skills include time management, planning, organization, self-discipline, and study skills (Kauffman, 2015). Other studies also indicate that learners with high self-efficacy exhibit higher cognitive capacity to achieve self-regulation for the purpose of realizing their academic goals (Nelson & Clark, 2015; Walters & Hoops, 2015). These learners are persistent in their efforts to understand, engage, and apply new learning in appropriate ways, to be academically successful (Caprara et al., 2008; Nelson & Clark, 2015; Walters & Hoops, 2015).

Research on self-efficacy has found that when learners have a high internal belief system about their ability to succeed, these learners will persist in their efforts to engage with course material, with peers, and with instructors, stay motivated to complete their program of study, build a system of accountability to keep focused, have a strong support system of family and friends and seek out university resources which support their academic goals (Caprara et al., 2008; Nelson & Clark, 2015; Zajacova et al., 2005). Studies by Nelson and Clark (2015) and Zajacova et al. (2005), which were conducted on college students, suggest that how learners perceive self-efficacy will affect their

commitment levels, persistence, and performance levels. These studies underscore the importance of the ways in which online universities may use research findings to guide student related policies which support online learners' needs. One such need includes earning a degree to maintain competitiveness in the job market or to acquire a new career path. By factoring the needs of learners, online universities may experience a reduction in their attrition rates (Britt, 2015; Hope, 2015).

Motivation and Adult Learners

Motivation has been the topic of many research studies, as psychologists seek to understand what drives or influences a person to engage in an activity. The concept of motivation has been widely researched in behavioral sciences (Deci & Ryan, 1985; Ergun & Avci, 2018; Park & Yun, 2017; Serin, 2018; Vallerand et al., 1992) and has been introduced in the theoretical section of this research study. Ergun and Avci (2018) explain motivation as “an internal force determining the direction of the motivation act and rousing the appropriate behavior” (p. 62). In his research Serin (2018) defined motivation as a person’s persistent effort to accomplish a task. Based on the research of Park and Yun (2017) it appears motivational levels of learners may vary based on their degree focus (i.e., bachelor’s or master’s), which in turn affect their academic success. Implicit in the literature, is the idea that motivation serves as a driving force in predicting academic success in online universities. These research studies underscore the importance of motivation in persisting towards academic goals for all learners, including learners with ADHD in online universities. The definitions of motivation clearly imply the need for learners to demonstrate high self-efficacy and motivational behaviors (IM

and EM) in their learning habits, as these factors serve as drivers to achieve their desired academic success.

The literature explains that motivation can be internal (IM) or external (EM) (Deci & Ryan, 1985; Park & Yun, 2017; Serin, 2018). IM is the inward desire of the learner to achieve mastery of a subject, whose gratification comes from purely learning new knowledge. EM, in contrast, is the act of providing some type of external reward to learners to increase their motivational levels (Deci & Ryan, 1985; Serin, 2018). Raising motivational levels of adult learners in online universities must be a priority if they are to achieve academic success. One way to achieve this is to present course content to learners that they can relate to in real time to increase their motivational levels. As an example, a classroom of learners in a counseling course could benefit more from a visual demonstration of a counseling skill being applied in a therapeutic setting and subsequently could increase student motivation and engagement in robust class discussions. These examples indicate the importance of the role of the instructor in creating conducive learning atmospheres to inspire their learners. Such considerations in the instructional design process are especially important for learners with ADHD. Arguably, instructors who create learning atmospheres which foster collaborative learning will promote greater student motivation, student self-efficacy, persistence, and academic success (Serin, 2018). Online learners who are given opportunities to choose learning activities will increase their curiosity and performance levels (Kahu, 2015; Serin, 2018).

In their research study consisting of 141 students combined (undergraduate and graduate students) who studied in online universities, Park and Yun (2017) found that individualized goals and interests impacted a learner's self-regulatory learning habits and learning persistence. Park and Yun (2017) used the motivational regulation strategy model (MRS), developed by Schwinger and Stiensmeier-Pelster (2012), to examine the motivational needs of undergraduates versus graduate students. The authors found that MRSs used to accomplish academic success were different for learners at the graduate level in online universities, which is the level where most online learners are found, as they re-enter school to advance themselves in their current career or to create different career paths for themselves (Park & Yun, 2017). Furthermore, Park and Yun's (2017) study also revealed that learners' perception of their own motivational beliefs impacted their level of motivation, and consequently their persistence in learning activities. Of importance, therefore, is the awareness that motivation levels differ across cultures, economics, and social status of online learners which affect their academic success (Park & Yun, 2017). This study emphasizes the role IM and EM play in the achievement of academic success for learners with ADHD who struggle with motivation beliefs of themselves (Farmer et al., 2015; Stavredes, 2011). The difference in motivation beliefs across cultures should be taken into consideration in the types of strategies that are employed in instruction, to encourage high IM.

Intrinsic and extrinsic motivations are used to help learners stay engaged and persist in their learning process (Brown, 2017; Deci & Ryan, 1985; Usher et. al., 2019). In online universities, learners are expected to self-regulate their learning and discovery

which can cause stress on learners who have low motivation (Wibrowski et al., 2016). Moreover, low motivation can be exacerbated when learners also struggle with learning the technology used to deliver course content (Ozerbas & Erdogan, 2018). Instructors who actively facilitate classroom activities and encourage peer collaboration activities can increase the curiosity and motivational levels of their learners (Wibrowski et al., 2016). Self-regulated learners in online universities must actively monitor their motivational levels to support strong engagement practices in their learning, as the literature shows a strong association between motivation and engagement (Deci & Ryan, 1985; Park & Yun, 2017; Serin, 2018).

An Overview of ADHD

The etiology of ADHD is widely researched in the behavioral science literature (de Oliveira et al., 2016; Farmer et al., 2015; Gioia, Isquith, Kenworthy, & Barton, 2002; Zeeuw et al., 2017). There is consensus in the research that gross inattentiveness, high impulsivity, and hyperactivity are marked characteristics of ADHD which prevails across all cultures (APA, 2013). Presentation of the disorder may be mild, in some cases, to severe in others (de Oliveira et al., 2016). These characteristics point to risk factors associated with interrelationships, achievements, and psychological functioning, including cognition (Ahmann et al., 2017; de Oliveira et al., 2016; Zeeuw et al., 2017). Studies also indicate that the characteristics of ADHD are also common across ethnicities and gender (Farmer et al., 2015; Zeeuw et al., 2017).

Historically, ADHD was viewed as a disorder affecting children, diagnosable as early as age 6 (APA, 2013). However, recent empirical research within the last ten years

shows that ADHD persists throughout the affected person's life span (Advokat, 2009; APA, 2013; Ahmann et al., 2017; Zeeuw et al., 2017). One of the struggles with adult diagnosis is that the disorder presents in a different way when compared to children (Ahmann et al., 2017; Zeeuw et al., 2017). For example, adults with ADHD may manifest the disorder as gross restlessness; easily losing belongings such as wallets, keys, cell phones, and eyeglasses; and task avoidance (APA, 2013). Children, on the other hand, more commonly display impulsiveness, hyperactivity, and high distractibility behaviors (APA, 2013; Zeeuw et al., 2017). Diagnostic criteria for ADHD as outlined in the APA (2013) for adults have also been adjusted from six symptomologies to five. Adults with ADHD must meet those criteria for the diagnosis as set forth by the APA (2013) which interferes with functionality in at least two domains as set forth by the APA (2013). The domains identified by the DSM-5 for ADHD are impulsiveness, hyperactivity, and inattentiveness (APA, 2013).

Impulsiveness explains behaviors which lack appropriate forethought, need for immediate gratification, poor social interrelationships, and low regards for consequences (APA, 2013). A presentation of hyperactive behaviors include excessive motor usage (always seems to be on the go), gross fidgeting, talks excessively, and speaks out of turn (APA, 2013). Inattentiveness explains those behaviors which persist beyond developmental levels, and which interfere with age appropriate functioning; these include low organizational skills, difficulty in sustained attention to complete tasks, gross forgetfulness, high distractibility, low attention span, and poor time management (APA, 2013). Prevalence rates in the disorder are reported at approximately 5% for children and

2.5% for adults in majority of cultures, according to the DSM-5 classification (APA, 2013). An important consideration in the assessment and treatment of ADHD is that culturally appropriate practices must be adhered to, to correctly diagnose and treat such persons (APA, 2013). In addition, according to the DSM-5 classification, males are more likely to receive this diagnosis when compared to females (APA, 2013).

ADHD and Learning

Adult learners with ADHD are presented with multiple learning challenges due to the way in which their brain may function (Bless, 2013; Huang-Pollock et al., 2014). A function of the brain relies on somatic sensory nerves and perception to make good judgments and concrete decisions (Hasler et al., 2016; Self et al., 2019; Schneidt et al., 2018). Invariably, humans incorporate their five senses in their thought process to arrive at conclusions. In the case of adult learners, impairments in vision and/or cognition negatively impact the way in which they filter, process and decode information to make good decisions (Hasler et al., 2016; Self et al., 2019). Adult learners, who for example, have impaired vision, may arrive at poor conclusions, in their research assignments for example. Good visual pathways support correct capturing and filtering of schematic data to achieve right conclusions (Hasler et al., 2016; Self et al., 2019). On the other spectrum, when the adult learner with ADHD filters information through his or her bio-cultural and socio-environmental dispositions, struggle with learning may be experienced when deficits are experienced in the primary somatic sensory organs, which are relied on to make good judgments (Bless et al., 2013; Hasler et al., 2016; Self et al., 2019). Such

deficits heavily impact the way learning takes place for adult learners with ADHD, and subsequently, their academic success.

ADHD, Neurobiology, and Environmental Factors

Much of the research literature focuses on bio-genetic and environmental factors which contribute to the onset of ADHD to understand its persistence, and then finding appropriate intervention strategies that help persons to manage their symptoms (Zeeuw et al., 2017). Several studies on bio-genetic factors have suggested that multiple genes are responsible for the onset of ADHD (Barnard, Pellow, & Solomon, 2011; Zeeuw et al., 2017). Although much more research is needed in human genome contribution to the disorder, evidence from the literature indicate that fathers who were diagnosed with this disorder increased the risk factors of their own children to inherit the disorder (Barnard et al., 2011; Zeeuw et al., 2017).

In addition to biological contributions, research has also identified the ways in which environment contributes to the development of ADHD. Specifically ADHD disorder is more likely to develop in children who are exposed to environmental pollutants such as lead poisoning, smoking, and whose mothers had pregnancy challenges associated with drinking alcohol and smoking (Ahmann et al., 2017; Barnard et al., 2011). Research further confirms that ADHD symptomologies are more evident in boys than girls at early onset, an anomaly which appears to even out as children age (Barnard et al., 2011; Major et al., 2013). This finding is of important consideration for university administrators and instructional designers in their planning and development of course work activities to a largely female dominated population who may struggle unaware of this disorder.

In their research, Zeeuw et al. (2017) explored diagnosis in learners and found that learners with ADHD who are undiagnosed may face risks in achieving academic success. The authors further suggested that a lack of diagnosis of the disorder may be a barrier to these learners who would not ordinarily seek ways to re-train the way in which they engage in learning, to optimize their learning capability. Learners with ADHD who are aware of the persistence of the disorder may be helped to manage their learning behaviors to increase their learning performance (Ahmann, 2017). Indeed, in his research Ahmann (2017) suggested that a diagnosis could help learners develop self-awareness skills to identify distractions and learn strategies to minimize these distractions that would interfere with their learning, an insight which is supported in the work of Farmer et al. (2015). While online universities do their best to provide support to learners with learning challenges, it is the students' responsibility to reach out for help, which may never happen since these students may not be aware they even have such a diagnosis.

What is clear from the studies on ADHD with adult participants is that those who have the disorder are not easily identifiable. Kuriyan et al. (2013) for example, noted in their research that ADHD is largely undiagnosed in adults when compared to other mental disorders. As a result, a multiplicity of risks associated with lack of diagnosis abound, including psychological trauma associated with peer conflicts, poor performance in the workplace, and low academic success for these learners (Fuller-Thomson et al., 2016; Morningstar et al., 2015; Zeeuw et al., 2017). Perhaps hosting ongoing discussion forums centered on issues that impact learning behaviors of adults with ADHD may be a positive step towards ameliorating negative factors which interfere with motivation and self-

efficacy, as an example of a recommendation made by Farmer et al. (2015) in their study which will subsequently contribute to increased academic success.

ADHD and Prescription Medication

Studies which examined the benefits of prescription medication to treat ADHD include Advokat (2009), and Advokat and Scheithauer (2013). Findings in Advokat and Scheithauer (2013) indicated that medication such as amphetamines has been beneficial in helping adult learners with ADHD improve behaviors which contribute to positive learner engagement, by as much as seventy percent (70%). Stimulant medications have been shown to help to reduce attention deficit behaviors, impulsiveness, and hyperactivity which may contribute to learner performance (Advokat, 2009; Advokat & Scheithauer, 2013).

Advokat (2009) raised concerns regarding the use of stimulants to improve cognitive functioning which was lacking conclusive findings in other research. However, Advokat and Scheithauer (2013) later established clear evidence that using stimulants to address ADHD impairments in the cognitive domain (example episodic memory) was possible. However, findings could not determine whether academic success was achieved because of learners taking a stimulant. One explanation for the reason medication may not improve academic success of adult learners with ADHD is that medication only addresses underlying symptoms such as distractibility and less on cognitive ability (Advokat, 2010). As Advokat (2009) summarized well, it appeared that the literature on the benefits versus the dis-benefits of prescription medication for ADHD is paradoxical.

Stimulant medication is the primary recommended way to treat ADHD disorder in adults (duPaul & Jimerson, 2014; Pliszka, 2007; Preston, O'Neal, & Talaga, 2013; Zeeuw et al., 2017). Stimulant medications work by increasing the dopamine levels in the brain which regulate mood, focus, and alertness (Advokat & Scheithauer, 2013; Preston et al., 2013).

However, some argue that stimulants do not specifically address cognitive function which influences learning, because stimulants work to improve attention and motor skills, but do not work on helping learners with ADHD with knowledge acquisition in the cognitive domain (Advokat, Lane, & Luo, 2011). Additional research suggests that stimulant medication has associated risks, including heart disease, obesity, and addiction (Mick, McManus, & Goldberg, 2013; Preston et al., 2013). Moreover, there is no definitive research which supports the use of prescription medication as a strategy to increase learning outcomes (Advokat et al., 2011). What the literature emphasizes is that stimulants taken provide some degree of help with increasing the learner's attentiveness and focus, not on increasing comprehension and learning (Advokat et al., 2011; Advokat & Scheithauer, 2013; duPaul & Jimerson, 2014).

Non-stimulants have also been used in a minor way to also treat ADHD symptoms (Preston et al., 2013). These medications work by increasing the chemical output of norepinephrine, a naturally occurring chemical in the brain that regulates behavior (Preston et al., 2013). Nonstimulants are sometimes used as an alternative to treats persons with ADHD when there are other concerns, such as risk for drug abuse (Advokat, 2009).

Other alternative ways to help learners manage their ADHD is suggested by Barnard, Pellow, and Solomon (2011) who conducted their research on children. In their study, the authors suggested a non-prescription approach which included exercise, diet, and vitamin intake (fish oils, vitamin B6, magnesium, iron, and zinc). This model for treatment, suggested the authors, had benefits in improving attentiveness, mental clarity and cognition, all factors which impact academic success. The current research studies on ADHD suggest it is complex to diagnose and treat in adults, whose symptoms differ from those of children and adolescents (Advokat et al., 2011; APA, 2013; duPaul & Jimerson, 2014; Major et al., 2013). Further understanding of ADHD in the context of the role of stimulants, non-stimulants, and alternative treatments on academic success is beyond the scope of this research.

Regarding taking stimulants to manage ADHD symptoms, the research literature provides different arguments of its efficacy to improve learning. Research suggests that the executive function within the cognitive domain of adult learners with ADHD is not significantly impacted by stimulants to enhance learning (Advokat, Guidry, & Martino, 2010; Advokat et al., 2011; Advokat & Scheithauer, 2013). While these research studies suggest that stimulants may play a minimal role in students' ability to focus better, they also suggest that other factors may contribute to better learning outcomes. As an example, DuPaul and Jimerson (2014) found out in their research that ADHD is associated with persistence, an observation which is also supported in the research of Richards (2016). Persistence is a concept which is discussed in this study as one factor which impact academic success in online universities (Richards, 2016).

Indeed, the findings on using stimulants as the way to enhance cognition and subsequent academic success is not conclusive and require more research (Advokat et al., 2010; Advokat et al., 2011; Advokat and Scheithauer, 2013). In their studies, Advokat et al. (2011) and Advokat and Mindy (2013) noted that academic success for adult learners with ADHD who took or did not take prescription medication was about the same. These findings suggest that there are other factors which affect adult learners with ADHD from achieving academic success, which cannot be treated with prescription medication. Therefore, understanding the role self-efficacy, IM, and EM play in academic success for adult learners with ADHD is an important one.

Academic Success and ADHD

Numerous studies show the impact of ADHD on learning and academic success (Mattox & Harder, 2007; Salmeron, 2009; Zeeuw et al., 2017). Due to the prevalence rate and persistent nature of ADHD among learners of all ages, researchers have focused on finding out which factors contribute to the onset and persistence of the disorder, which they have found out is contributing to negative student academic outcomes (Advokat et al., 2011; DuPaul & Jimerson, 2014; Zeeuw et al., 2017). In fact, learners who take stimulant medication were found to have about the same GPA score when compared to those with ADHD who did not take a stimulant (Advokat et al., 2011) which point to other potential factors affecting students' academic success. Symptomologies associated with this disorder that impacts learning in online universities include gross disorganization skills, poor time management, high distractibility, and inattentiveness to details (APA, 2013; Farmer et al., 2015; Serin, 2018). Among the challenges that face

learners with ADHD, researchers have identified low communication skills, low solution-focused skills, and cognitive dissonance as barriers to their academic success (Farmer et al., 2015; Serin, 2018). Extant studies on the topic, including that of Kizilcec et al. (2017) found that learners with ADHD were more likely to struggle with self-efficacy, and motivational levels, which are identified as requisites for academic success (Serin, 2018). Evidence in the literature also suggests that adult learners with ADHD struggle more with those skills that are preconditions to academic success (du Paul et al., 2017; de Zeeuw et al., 2017; Serin, 2018).

Several studies identify self-confidence as an indicator of how persistent a learner is based on his motivation orientation (Ambrose et al., 2010; Brown, 2017; Serin, 2018; Usher et al., 2019). Adult learners with ADHD are observed as having lower self-confidence than the average student which interferes with their motivational levels (Hwang et al., 2018). As stated earlier in the literature, this population has unique struggles with executive function associated with impairments in the neurocognitive functioning of brain cells (Bless et al., 2013; Hasler et al., 2016; Self et al., 2019). When this population perceives their learning as arduous, confidence levels may potentially decrease which consequently affect self-efficacy beliefs and motivation. Therefore, instead of persisting in a task, such as completing a research paper that may be challenging, these learners may disengage and place the burden for their disinterest on the nature of the assignment, for example. One of the strategies which may be used to keep learning interest high then, is to have learners choose a research topic or task that has “instrumental value” (Ambrose et al., 2010, p. 75).

An example of *instrumental value* would be asking psychology students to conduct a research study in an area of interest that would be beneficial to them realizing their long term goal of advancing in the profession. Such a strategy aligns well with studies which show a strong association with self-confidence and persistence in learning activities (Brown, 2017; Usher et al., 2019). Personal agency beliefs will indeed play a major role in how adult learners with ADHD perceive learning and become motivated to engage and persist in their learning (Bandura, 1977, 1986). A key consideration for this population of learners is to help them identify for themselves whether they are internally motivated or externally motivated, the value of their learning goals alongside course learning goals and provide a nurturing environment for their growth; this type of help may support higher levels of academic success for these and other learners, in general terms (Ambrose et al., 2010; Johnson & Stage, 2018).

In an online environment, support from faculty, the institution, and healthy peer relationships are listed as essential factors to foster academic success (Salvo & Welch, 2019). Learners with ADHD may struggle with social skills which interfere with cultivating and maintaining healthy relationships (APA, 2013). Communication skill is an important factor in this exchange, which this group of learners struggle with. Learners who fail to express themselves clearly often may find themselves isolated from classroom conversations with peers and faculty which further erodes self-confidence, self-efficacy, and motivation (Johnson & Stage, 2018; Serin, 2018; Usher et al., 2019). Indeed, cultural differences in communication styles may further affect this group of learners, which influences the emergence and expression of self-confidence, self-efficacy, motivation,

and academic success (Brown, 2017; Johnson & Stage, 2018; Usher et al., 2019). Perhaps a concerted effort from university administrators in conjunction with instructional designers, instructional staff, and adult learners to identify ways to achieve academic success is the way for future endeavors to raise and sustain high enrollment levels of degree seeking students.

Academic Success Factors for Students With ADHD in Online Universities

Following in this section is an overview of the literature highlighting the growth of online universities which has attracted many adult learners to higher education, including those who ADHD, and what learning in online universities might look like for them.

The number of learners attending universities has grown significantly due to the flexibility online programs offer (Britt, 2015; Farmer et al., 2015; Fleming & Wated, 2016; Hwang et al., 2018; Kezar, 2014; Kizilcec et al., 2017). According to the literature, nontraditional learners experience higher turnover in their academic pursuits than their traditional counterparts based on academic rigors, attributed in part to how weekly assessments are structured (de Oliveira et al., 2016; Coetzee, 2014; Fleming & Wated, 2016; Kizilcec et al., 2017; Richards, 2016; Zajacova et al., 2005). In their study on traditional college students, Farmer et al. (2015) noted that learners with ADHD exhibited poor study habit skills, which affected their academic success. In fact, in their research comparing students diagnosed with ADHD and those who did not have the diagnosis, Farmer et al. (2015) found that 37.5% of those students with ADHD completed their degree. This percentage was lower than their counterparts, who reported a higher

graduation percentage of 51.2%. In another research study, Fleming and Wated (2016) found that college learners with ADHD reported lower GPA scores when compared to those who did not have the diagnosis.

To ameliorate the problem with learning in higher education, learners with ADHD could be encouraged to seek out help at the beginning of their programs to increase their academic success (Farmer et al., 2015). Britt (2015) and Coetzee (2014) for example, talk about the importance of setting clearly defined goals in course syllabi to support sustained engagement of learners and foster continuous learning. In their research, the authors have noted that learners in online universities require a more didactic approach to learning that supports high self-efficacy and high motivation. Some factors that may have contributed to lower academic performance by adult learners with ADHD include lower self-discipline skills, inadequate learning strategies, and poor study skills which support academic success (Britt, 2015; de Oliveira et al., 2016; Farmer et al., 2015; Fuller-Thomson et al., 2016; Major et al., 2013).

The research literature has provided sufficient evidence that learners with an ADHD disorder perform less academically, that is, reported lower GPA scores, when compared to learners without the diagnosis (Farmer et al., 2015). Concerns for this group of learners spurred more research by Major et al. (2013), who examined self-efficacy behaviors and self-regulated learning behaviors of adolescents. In their study, Major et al. (2013) observed that young female learners with a diagnosis of ADHD reported felt less confident than their male counterparts in modeling self-regulated learning skills which support motivation, coping strategies, and self-efficacy. Additionally, these learners felt

less capable of managing environmental challenges that affected their focus and alertness in their knowledge acquisition. One conclusion drawn by the authors is that females may have a more accurate understanding of their self-regulation skills than males (Major et al., 2013). Because self-regulated learning skills are essential to positive engagement and academic success, online universities can utilize this research to inform training and teaching practices. To conclude, learners with ADHD struggle more in their academic performance in higher education (Farmer et al., 2015; Major et al., 2013). Bearing in mind that ADHD disorder is validated as persisting into adulthood (Advokat et al., 2011), one may argue that research findings presented have implications for how female and male learners with ADHD in online universities can maintain self-efficacy and motivation to achieve academic success.

In summary, researchers suggest that youth and college learners in traditional and online learning environments who received a diagnosis of ADHD perform less satisfactorily than their peers without the disability, due to perceived inability to produce academic work of a high quality (de Oliveira et al., 2016; Farmer et al., 2015; Major et al., 2013; Zeeuw et al., 2017). In fact, Fleming and Wated (2016) noted in their research that learners with learning challenges may exhibit low self-efficacy in the process of internalizing, organizing, and sharing new knowledge under testing conditions or instructor-led feedback. Given the rate of underachievement this population possess, and because such outcomes have far-reaching implication from a socioeconomic standpoint, a better understanding of how adult learners with ADHD function in online universities is important, because these learners may exhibit a different approach in

acquiring, internalizing, and processing knowledge than learners without ADHD. Perhaps it is this difference in the approach to knowledge acquisition that delineates the lines of academic success for learners with ADHD.

Other Challenges for Learners With ADHD

Memory plays an important role in the way adult learners learn. In fact, the function of memory is a key factor in the way in which adult learners analyze, create, and manage their learning behaviors (Nazer, Mirzaei, & Mokhtaree, 2018). An adult learner with ADHD faces many challenges in their learning due to the way in which their brain receive information through their visual pathway and stores this information. The way in which information is received, processed, and stored affects adult learners' metacognitive skills (Hasler et al., 2016; Nazer et al., 2018; Self et al., 2019).

Adult learners also filter information through their bio-cultural lens and socio-environmental lens which influence the way information is received in their visual pathway. This is another factor that impacts adult learners' ways of engaging in their own learning and their ability to use self-regulated strategies to support academic success (Bless et al., 2013; Hasler et al., 2016; Kizilcec et al., 2017). Consistent with Bandura's (1977) theory on self-efficacy, it could be argued that cognition is impacted by bio-cultural and socio-environmental factors, which then impact learning behaviors for adult learners with ADHD.

The preceding paragraphs on the challenges adult learners with ADHD face in their learning provides context for further exploring the literature regarding the way in which adult learners with ADHD engage in self-directed learning, how executive functioning is

impacted during self-directed learning, and how executive functioning impacts cognition, perception, and working memory.

Self-Regulated Learning and ADHD

One of the overarching concerns in the literature pertaining to learners with ADHD is self-regulated learning. Self-regulated learning refers to how learners measure their performance in their learning process (Kizilcec et al., 2017; Winne & Hadwin, 2010; Zimmerman, 2000). Put succinctly by Ambrose et al. (2010), learning is an iterative process in which the learners become actively engaged as they filter current knowledge alongside prior knowledge.

Several models have been developed to examine the paradigms of thought learners have as they engage in learning, including making recommendations to improve learners' capacity to acquire knowledge and improve their academic success. One of the first paradigms of thought refers to the way in which an environment can be created to nurture the learning process (Kizilcec et al., 2017; Winne & Hadwin, 2010; Usher et al., 2019). According to the research, when conditions are conducive to learner engagement, learners will have a higher intrinsic motivating level to achieve their goals, which may be as simple as completing homework assignments, to a more elaborate goal, such as passing an exam; therefore, situational contexts are important considerations for the delivery of knowledge in self-regulated learning environments (Kizilcec et al., 2017; Winne & Hadwin, 2010).

Another paradigm of thought involves how knowledge is presented to self-regulated learners. Knowledge in this context is a combination of theories, concepts,

facts, culture, and perceptions, which are incorporated in the activity of processing information and making judgments (Ambrose et al., 2010; Bless et al., 2013; Hasler et al., 2016; Self et al., 2019; Winne & Hadwin, 2010). It is important to note that each learner comes to the classroom with his or her prior knowledge which may vary significantly. As such, learning capabilities may differ across the spectrum of learners pursuing higher education; for example, learners enrolled in a psychology course may demonstrate different learning capabilities from learners enrolled in a science course. Course instructors make grave mistakes in assuming that everyone has the foundation of knowledge requisite for their course and may even assume that their learners will connect prior experiences with new knowledge to support new schemas (Ambrose et al., 2010; Stavredes, 2011). In online universities, the templates for learning are usually already created for the instructor who merely facilitates learner interactions in the discussion forums and provide summative feedback on weekly assignments. In this situational context, learners' silence may be misinterpreted to mean they understand course goals and objectives, which may in fact be dissimilar from their own goals and objectives (Ambrose et al., 2010; Kizilcec et al., 2017; Stavredes, 2011), thus affecting those learners' motivational levels and self-efficacy (Ambrose et al., 2010; Usher et al., 2019). Ineffective engagement strategies, for example using only the course syllabus for instruction, instead of incorporating visuals in weekly instruction, where possible, to stimulate learning, and not helping students to make meaningful application through strategic questions that challenge cognitive thinking. Online university instructors who utilize explicit instruction in engaging learners would increase learners' self-efficacy and

motivational levels (Farmer et al., 2015). Examples of explicit instruction include scaffolding, cueing, meta-cognition, and formative feedback (Stavredes, 2011; Svinicki & McKeachie, 2014).

Self-regulated learning has been broadly researched to provide insight into the nuances of this type of learning and harness interventions that support learners' academic performances (Kizilcec et al., 2017; Winne & Hadwin, 2010; Zimmerman, 2000). This is so because online learning has opened a world of opportunity to learners who are looking for a flexible work/study life balance (Kizilcec et al., 2017). Learners attend online universities for myriad reasons, including those who are looking to increase their competitive edge in their career, as in the case of getting a promotion or changing career focus or earning a degree in an area of interest solely based on intrinsic satisfaction (Britt, 2015; Hope, 2015). As such, strong emphasis on strong self-regulated learning strategies is an important consideration if online universities hope to retain high enrollment levels along with high student academic performance throughout the course of their study. Exploring and incorporating a variety of creative instructional styles at online universities with emphasis on self-regulated learning will positively impact academic success when learners are empowered with the tools and modeling from instructors to correctly engage in higher order thinking skills (Ambrose et al., 2010; Budash & Shaw, 2017; Ergun & Avci, 2017; Kizilcec et al., 2017; Stavredes, 2011).

Kizilcec et al. (2017) found that learners who exhibit lower self-regulated learning skills have corresponding low self-efficacy and low IM levels. The authors validated the use of effective engagement strategies which included scaffolding, metacognition and

self-regulated strategies to increase learner engagement and increase academic success. What we do know from the research is that learners with ADHD struggle with self-regulation skills, time management skills, and meta-cognitive skills (Farmer et al., 2015; Zeeuw et al., 2017). This population of learners benefit greatly from high instructor feedback which focuses on clarifying learning expectations, clarifying learning objectives, referring learners to the course rubric, and encouraging positive self-efficacy, IM and EM behaviors. These strategies when applied consistently by instructors can help learners increase their self-regulated learning skills and achieve academic success.

Executive Function

The act of learning involves the deliberate engagement of mental skills with the material of interest to achieve understanding, retention, and transfer of knowledge appropriately (Ambrose et al., 2010; Bless et al., 2013; Hasler et al., 2016; Schneidt, Jusyte, Rauss, & Schonenberg, 2018). In the learning process, biological, environmental, and emotional factors all play a role in hindering or supporting academic success (Huang-Pollock & Karalunas, 2010; Rabinovitz et al., 2016; Stavredes, 2011; Zeeuw et al., 2017). From a biological standpoint, one may infer that successful learning is connected to the health of the learners' neurological pathways that influence executive functioning (Huang-Pollock & Karalunas, 2010; Zeeuw et al., 2017). As mentioned earlier, learning also involves the individual's environment and emotions; in fact, research confirms that most of a learner's knowledge is a direct result of his or her interaction with his or her environment (Ambrose et al., 2010). Therefore, the emotional state and perception of the learner will greatly contribute to how well he or she accesses, process, retains, and recall

knowledge. It is with this backdrop that a discussion will continue to discuss the literature on executive function and cognition, perception, and working memory.

Executive Function and Cognition

Cognition is a way of thinking and processing information that evidences how learning has taken place in an individual (Retnowati, Ayres, & Sweller, 2017). In other words, this is the way learners utilize the executive function (EF) system of the brain to make sense of new knowledge alongside prior knowledge (Huang-Pollock & Karalunas, 2010; Jarratt, 2015; Kanwisher, 2008; Retnowati et al., 2017). Dysregulation in the cognitive domain causes impairment in mental reasoning skills which are necessary to support effective engagement with the learning process (Huang-Pollock & Karalunas, 2010; Jarratt, 2015; Kanwisher, 2008). Learners with ADHD experience this kind of dysregulation which is associated with academic challenges (Jarratt, 2015; Zeeuw et al., 2017). Moreover, learners with ADHD may struggle in their communication skills and mental status (for example experiencing anxiety) which further compromise their learning experiences (Jarratt, 2015; Zeeuw et al., 2017). Furthermore, dysregulation in the learners' executive function (EF) is often associated with faulty cognitions. For example, learners with ADHD may incorrectly process data due to abnormalities in their prefrontal cortex, an area in the brain which is responsible for regulating working memory [which impair good judgment] (Fleming, Heintzelman, & Bartholow, 2016; Huang-Pollock & Karalunas, 2010; Zeeuw et al., 2017).

For learners with ADHD, dysregulation in EF interferes with several skills sets, including analytic, reasoning, and problem solving skills. Compromised cognitive skill

sets in the EF domain are negatively associated with self-efficacy and motivation (Jarratt, 2015). When paired with another disorder, for example anxiety, EF of learners with ADHD is even more compromised, and negatively impacts their efforts to sustain academic success (Jarratt, 2015). University learners, therefore, are at increased risks for failing and exiting prematurely their program of study in online universities when they perceive the work as being too strenuous (Britt, 2015; Jarratt, 2015).

Learners in online universities must have strong self-regulated learning strategies to have positive learning outcomes. A successful self-regulated learning is a person who has the capacity to successfully plan, organize, manage time, and study independently (Knowles, Holton, & Swanson, 2015; Winne & Hadwin, 2010). Learner with ADHD struggle with EF which affects their cognition. Helping these learners to practice self-awareness of their own learning challenges and seek out learning strategies to mitigate those challenges may be one way online universities can provide support.

Executive Function and Perception

Perception plays a major role in the learning process (Bless et al., 2013; Hasler et al., 2016; Self et al., 2019; Schneidt et al., 2018). From an epistemological viewpoint, perception is a product of a person's social, environmental, and family orientation (Lu & Wan, 2018). In other words, perception involves the user's five senses in the filtration process of acquiring and using knowledge, alongside the environment, biological, and ecological system the user is connected to (Lu & Wan, 2018). When a learner is acquiring knowledge using a top down filtration system approach, he or she is utilizing attending skills to understand and process incoming data (Proulx, 2007); when a bottom up approach

is being utilized in the learning process, the learner relies heavily on visual cues to make meaning of the data during the filtration process (Hasler et al., 2016; Self et al., 2019; Schneidt et al., 2018).

Within online university programs instruction primarily is given with the expectation that learners will utilize attending skills (i.e. cognition, reflective, analytic) to respond to weekly lessons and assignments. Regarding learners with ADHD, problems with learning may occur due to the way their cognition functions (Farmer et al., 2015). Furthermore, if a learner is more visual in his or her learning, difficulties with assimilating learning resources which are devoid of visual presentation and explanation may become even more pronounced (Baddeley, 2012; Hasler et al., 2016). Each approach to filtering and processing data achieves different outcomes; this has implications on the learning performance and academic success of learners with ADHD in online universities.

Executive Function and Working Memory

Working memory is another subtopic addressed in the literature as impacting adult learning (Huang-Pollock et al., 2016). Working memory describes the way in which the human brain sorts and manages information that can be retrieved with relative ease. Attention is critical in this area since information can be lost if the learner becomes distracted. Adult learners with ADHD, as delineated in the DSM-5 (APA, 2013), suffer from inattentiveness, which stems from a compromised EF system which is substantiated in several studies (Huang-Pollock & Karalunas, 2010; Jarratt, 2015; Kanwisher, 2008; Retnowati et al., 2017). Optimal functionality of the prefrontal cortex is critical to the performance of learners' working memory which is regulated in the EF system (Baddeley,

2012; Oberauer, & Lewandowsky, 2014). Huang-Pollock et al. (2016) for example, found in their research that a compromised prefrontal cortex, which regulates EF, subsequently affected learners' ability to optimize their working memory to organize, store and retrieve information correctly. In his research, Baddeley (2012) also found that when learners' vision and spatial pathways were compromised, deficits in working memory occurred; this had corresponding effects on learners' mental reasoning skills and processing speed.

Strong mental reasoning skills are foundational to learning at tertiary levels. Particularly in online universities, learners rely heavily on these skills to complete assignments which require sustained mental attention and effort (Dagry, Vergauwe, & Barouillet, 2016). Utilizing sustained mental efforts and reasoning skills occur within the domain of working memory, an area those learners with ADHD struggle in (Dagry et al., 2016; Ehm, Koerner, Gawrilow, Hasselhorn, & Schmiedek, 2016). A compromised working memory affects adult learners with ADHD in many ways, including compromised abilities to filter data successfully, organize data in meaningful ways that can be easily retrieved from long term memory, engaging in multi-tasking, and working on their own with little guidance (Baddeley, 2012; Dagry et al., 2016; Vance & Luk, 2000; Yuill & Lyon, 2007). Information overload can thus cause learners' working memory circuitry to misfire, which may be one explanation, why adult learners with ADHD struggle with sustained mental efforts in online universities.

Working memory processes have implications for understanding how adult learners with ADHD experience academic success in online universities. These learners exhibit difficulty with organizing and processing information in a timely way, as their

processing skills are slower (Ahmann et al., 2017; Baddeley, 2012; D'Esposito, & Postle, 2015). In addition, these learners may experience challenges in processing complex data, to be retrieved and incorporated in their assignments, which is empirically validated in several studies (Ehm et al., 2016; Farmer et al., 2015; Serin, 2018). Furthermore, these learners may find it very challenging to concurrently research, sort through complex data, and prepare complex assignments in a short turn-around time (Becker et al., 2018; Ehm et al., 2016; Farmer et al., 2015; Serin, 2018). Challenges with EF may lead to low self-efficacy and low motivation for adult learners with ADHD. As a point for advocacy, online universities that include a residency component to their degree programs should consider presenting risk factors associated with compromised EF for self-regulated learning s to students so that those who experience challenges in EF may become aware of the types of help they can get. This may encourage an increase in student commitment to persist and achieve academic success.

Factors Impacting Academic Success in Online Universities

Academic success is a term used to evaluate learners' performance in educational environments. A review of the literature indicated that learners' GPA scores are primarily used in the evaluation review process to uncover whether learning has taken place, and by what percentage (York et al., 2015). The terms *academic success*, *academic achievement*, and *student success* are used interchangeably throughout the literature review. York et al. (2015) for example, found several definitions using either one of these constructs to mean the same thing, meaning, what factors from an individual, environmental, and socio-economic standpoint impact learners' ability to achieve success in their educational

pursuits and how do their learning translate into employability in their fields or similar of occupation and promotional capacities (Salvo et al., 2019; York et al., 2015).

Adult learners pursue higher education for various reasons. Some of these reasons include the ability to choose an online university which aligns with their career goals, choosing an online university for convenience with travel and class flexible schedules, and choosing an online university which enable them to earn a degree that allows them to balance other life roles with education (Barbour & Reeves, 2009; Brown, 2017; Coetzee, 2014; Hope, 2015; Kuh et al., 2006; Stavredes, 2011). As online universities grow in popularity among adult learners as a preferred way to engage with tertiary education, more pressure is placed on these institutions to clearly document evidence of learners' success via the use of various assessment constructs, including GPAs. In fact, Salvo et al. (2019) and York et al. (2015) both found in their research studies that online universities use multiple measures of assessment to support their program effectiveness and to market their program offerings. The authors' findings further indicate that online universities may be less attractive for some groups of learners who may lack financial resources which would enable them to successfully engage in asynchronous platforms.

Learner Engagement Practices

Higher education learners bring a composite of experiences into their learning environment which adds to the complexity of the learning fabric in online universities. These learners (eighteen years and older) bring their own unique engagement practices into the online classroom which may or may not engender strong learning experiences. Engagement practices may be culture-bound and even work-place bound (Lu, & Wan,

2018; Salvo et al., 2019; York et al., 2015). When these engagement practices do not fit within the mold of online learning engagement, learners will have to make the necessary adjustments if they wish to have a high academic success (Wibrowski et al., 2016). Examples of adjustments include study habits and time management skills (Farmer et al., 2015). Furthermore, as the research findings in the work of Salvo et al. (2019) and York et al. (20115) show that appropriate learner engagement practices are central to achieving academic success, it would be beneficial for example, for learners to adjust their engagement practices as they transition into higher education to achieve academic success (Britt, 2015; de Zeeuw et al., 2017; Kuh et al., 2006). Examples of positive learner engagement practices include the use of organizers to help learners connect prior knowledge with new knowledge, and practice tests can help learners monitor their comprehension of key information (Stavredes, 2011).

Language and Culture

Culture plays an important role in the way in which learners learn and engage (Lu, & Wan, 2018). Learners in higher education bring diverse values, attitudes, behaviors in the way they view and engage their learning experiences. The constructs individualism and collectivism are used in research to explain the way culture influences learners' perception and ways of expression (Matsumoto, 2001). In fact, Peng, Aimes, and Knowles (2001) noted that culture shapes the way in which learners filter, organize and rationalize data. This observation is supported by research also conducted by Lu and Wan (2018) whose research underscores the important role culture played in the way learners filtered and organize data. Bearing in mind that language and culture shapes

learners' communication, engagement, and learning styles (Peng et al., 2001; Lu & Wan, 2018), it is an important consideration to include these factors in the design and facilitation of online degree programs.

Knowledge Acquisition Skills

Politis and Politis (2016) list six attributes online learners should have to be successful in an online learning environment. These attributes are as follows:

“Communication/problem solving; personal traits; control; organization; negotiation; and liberal arts/nonverbal communication” (p209). The findings of the study suggested online learners' motivation directly impacted their propensity to acquire knowledge. In addition, the study revealed that learners' preparedness in technology use directly impacted in a positive way, their level of motivation and level of preparedness for the online experience (Politis & Politis, 2016). Furthermore, the study raised awareness of how ease of navigating the technology platform (example BlackBoard), encouraged learner engagement and motivation to use effective communication strategies to acquire knowledge (Politis & Politis, 2016). This study emphasizes key attributes which learners should have if they are to experience academic success.

Previous research studies cited allude to the fact that adult learners with ADHD have difficulty with organization skills, good study habits, maintaining healthy social relationships, and problem solving skills. In fact, Hwang et al. (2018) used the term “grit” (p. 708) to describe the personality or fortitude that online learners should have if they were to achieve academic success. One could argue that the same fortitude would need to be held by adult online learners with ADHD.

Learner Persistence

Persistence describes a person's resolve to complete a task or activity despite oppositions (Brown, 2017). Learner persistence from an academic perspective, then, describes the mental attitude of a student to commit to the academic process to earn his or her degree in a timely manner. The literature review reveals that perseverance has strong association with academic success (Usher et. al., 2019; Wolters & Hussain, 2015). Extant studies examine learner persistence within several domains that promote or restrict student engagement (Ergun & Avci, 2017; Usher et al., 2019; Zajacova et al., 2015). Factors cited as negatively impacting learner persistence include cultural background, gender, college preparation skills, study habits, academic rigors, and technology skills (Ergun & Avci, 2018; Wolters & Hussain, 2015; Zajacova et al., 2005).

Higher education learners who study in online universities encounter these challenges in addition to having to wrestle with other competing factors. Learners for example, must integrate their academic studies with their other life roles including caregiver, homemaker, and provider (Brown, 2017; Budash & Shaw, 2017). When support is limited or non-existent from learners' family system, gross stress may be experienced which may lead to premature exodus from their academic studies (Brown, 2017). Life issues such as loss of employment for some groups of learners, example minority students (Zajacova et al., 2005), relocation factors, or any life altering event including marriage or divorce are also cited as hindering factors to learner persistence (Budash & Shaw, 2017). In their study, Ergun and Avci (2018) reported that adult learners who engaged in the habit of enrolling and dis-enrolling from degree programs were at a higher

risk for completing their degree. This behavior exhibited by some learners in higher education has implications for academic success.

Another study by Johnson and Stage (2018) also pointed out the danger of being in and out of college programs for multiple periods of time by college adult learners who desire to get their degrees. The authors indicated that this practice was counterproductive to learning behaviors which support program completion and academic success. It can be argued, that for adult learners to be successful in online universities, they must have a cadre of supporters - family, friends, and well-wishers, to surround themselves with (Johnson & Stage, 2018). Learners with ADHD in online universities must deal with these obstacles, in addition to wrestling with their self-efficacy to stay focused and motivated, an important factor of learner persistence (Alkis & Temizel, 2018; Deci & Ryan, 1985; Farmer et al., 2015).

Summary of Barriers to Academic Success

Barriers to academic success occur at all phases of a person's educational pursuit. Barriers delineated in this section serve to create awareness to the educational community of those factors that may hinder learning. Moreover, self-efficacy and motivation (IM and EM) levels could also be lowered for the adult learner with ADHD, whose knowledge acquisition skill is compromised in the EF domain (Jarratt, 2015; Retnowati et al., 2017). When barriers to academic success are not readily identified and addressed appropriately, these barriers can become the catalyst of changing the trajectory of a learner's academic outcome. Therefore, by bringing awareness of barriers to learners, school administrators,

and instructors of factors that can potentially sabotage the learning process, including learner engagement and learner retention, academic success may become achievable.

Determinants of Academic Success

Self-Efficacy in the Context of Higher Education

Research supports the idea that students who exhibit high self-efficacy will exhibit high persistence to achieve academic success (Bandura, 1997; Kwon et al., 2018; Walters & Hoops, 2015; Zajacova et al., 2005); in other words, academic success was positively associated with high self-efficacy. This was particularly true for traditional college learners who were able to identify clear goals before the start of their programs (Caprara et al., 2008; Nelson & Clark, 2015). One could argue that learners with ADHD, who enter higher education with a strong self-belief that they will achieve academic success, will apply themselves intrinsically to the demands of academic study to realize their goals (Nelson & Clark, 2015). This perspective is supported in the research literature which notes that when adult learners have high self-efficacy and have a proven record of past success, they will persist in new academic challenges (Nelson & Clark, 2015). Therefore, the contributing factor of self-efficacy impacting academic success is an important one for scrutiny, when examining academic success of learners with ADHD in online universities.

Self-Efficacy and Academic Success

Research studies indicate that self-efficacy is an important factor in the adult learners' academic journey (Alkis & Temizel, 2018; Bandura, 1977, 1997; Zajacova et al., 2005). Specifically, within the body of literature, self-efficacy is viewed as an

important factor in leveraging academic success for online adult learners (Bandura, 1997; Zajacova et al., 2005). Ozerbas and Erdogan (2018) found that appropriate use of technologies in the learning exchange support learners' academic success. Online universities rely heavily on technology software to administer instruction. Learners who are not technologically savvy may be at risk for lower academic performance, and consequently lower academic success (Hwang et al., 2018). Ozerbas and Erdogan (2018) also noted in their findings that online universities learners must have high self-efficacy for them to successfully utilize the various technologies that are used to deliver instruction and learning opportunities. A big concern for learners who are not savvy in using technology resources is finding a balance in learning technology in tandem with their coursework without undue stress. Learners with ADHD already struggle with time management, distractibility, and cognitive dysregulation; any type of undue stress can potentially reduce self-efficacy, lowers motivation, and lowers persistence (Ergun & Avci, 2018; Usher et al., 2019).

Learners may acquiesce to academic pressure by withdrawing prematurely from their degree program as their frustration increases; this phenomenon is indicated in the study findings by Hwang et al. (2018). In addition, when learners perceive themselves being capable of learning the skills to use technology systems well with support, they will persist in gaining mastery of these systems in the learning process (Ergun & Avci, 2018; Hwang et al., 2018). The research literature seems to suggest that high self-efficacy may be modeled by learners with ADHD when they perceive they are being helped by their universities (Bandura, 1977, 1986; Farmer et al., 2015; Zajacova et al., 2005). However,

it is important to note that for universities to support learners with ADHD, this population needs to be willing to self-disclose an ADHD diagnosis in order to receive additional supports.

Several researchers agree that academic success is measured by a learner's overall GPA score (Hwang, Lim, & Ha, 2018; Salvo et al., 2019; York et al., 2015). Kauffman (2015) evaluated several factors that affected learners' propensity to succeed in online universities which included learning preferences, instructional goals, and instructional delivery methods. The evaluation concluded that online universities may not be suitable to every learner. For example, learners who exhibit characteristics of auditory learning may struggle in an online learning environment. Moreover, online learners must demonstrate strong metacognitive, intrinsic motivation, high self-efficacy, time management, and organizational skills to achieve successful academic outcomes (Kauffman, 2015; Usher et al., 2019).

Hwang et al. (2018), Kauffman (2015), and Ozerbas and Erdogan (2018) share the perspective on factors which adult learners who study at online universities must harness if they are to be successful online learners. These factors are self-efficacy, motivation, and persistence which characterizes the mindset learners with ADHD must have to achieve academic success. In fact, grit (i.e. perseverance) and self-efficacy have been studied to evaluate their impact on learner performance by Hwang et al. (2018) and Usher et al. (2019). In a quantitative study done by Hwang et al. (2018) participants were 509 female learners who pursued higher education in an online university based in South Korea. The average age of participants was 37 years with representation from those

entering university in their first year (38.7%), midway in their studies (31.2%) and those in final stages of completion (27.9%). The study found that lower self-belief and low persistence is associated with lower academic success. Findings provide more evidence that learners with ADHD struggle with academic success in online universities and need institutional support to achieve success.

Usher et al. (2019) examined the impact perseverance and self-efficacy had on learning outcomes on elementary school children. It is worthwhile to include this research finding in this study also as other research studies verify the persistent nature of ADHD from childhood into adulthood (Advokat, 2009; de Oliveira et al., 2016; Farmer et al., 2015; Fleming & Wated, 2016). Indeed, Advokat (2009) noted that between 49%-66% of these children would still have symptoms of ADHD in adulthood.

In the study conducted by Usher et al. (2019) to closely examine perseverance and self-efficacy, they recruited participants from three elementary and four middle schools in an urban school district in Southeastern United States. There were a total of 2,430 learners with an equal representation of the male and female genders. The sample consisted of Caucasians (53.5%); African Americans (31.2%); Hispanics (8.8%); Asians (2.5%); and other racial and ethnic groups (3.9%). The study showed a strong association between perseverance (a strength) and self-efficacy as influencers on academic success. The authors conducted a mediation analysis, using self-efficacy as the mediator variable in looking at the relationship between perseverance and academic success. The findings from the studies of Hwang et al. (2018) and Usher et al. (2019) further validates the construct self-efficacy as a predictor on academic success. It can be suggested that

learners with ADHD would face similar challenges with self-efficacy in online universities.

These two studies highlight the need for online universities to create course content that aligns with core learning objectives, instructional design, and formative and summative assessments to support learners' academic success (Kauffmann, 2015). In this way, learners may be able to positively relate to courses as they are better able to monitor their own learning performance in an organized way. Additionally, consideration could be made for course instructors to receive training in online facilitation to ensure integrative and synergistic learning is occurring in the online classroom. Finally, the size of classes in online learning is a factor which determines students' academic success. Small group discussions support self-regulated learnings as students build communities where they can learn from each other and persist in an asynchronous platform (Hwang et al., 2018; Kauffmann, 2015; Stavredes, 2011).

Self-Efficacy and Motivation

There is much research on the shared roles of self-efficacy and motivation on academic success (Hau and Kang, 2016; Yilmaz, 2016; Ergun & Avci, 2017; Usher et al., 2019). Findings from the research done by Ergun and Avci (2017) for example, were consistent with the literature research which noted the significance self-efficacy and motivation had on learner engagement and self-regulated learning in online universities. In their study, Ergun and Avci (2017) examined how knowledge sharing self-efficacy (KSE) and motivation predicted learner engagement and sense of community in an online environment. Ergun and Avci (2017) defined KSE as "a person's belief in his/her own

skills to be able to share knowledge in either online or face-to-face environments” (p. 62). Study participants were a total of 284 students studying at two online Turkish universities. The findings pointed to the influence of self-efficacy and motivation on making or breaking a learner’s successful procurement of a degree. Study findings also found that learners who scored high in both self-efficacy and motivation typically had a greater participatory level in online communities, higher engagement levels, higher cognitive levels, and higher persistence levels. It was also of significance to note that learners, who valued their peers’ input in their own knowledge acquisition and development, increased their self-efficacy and motivational levels as they engaged in the learning exchange synergistically. Not surprising, Ergun and Avci’s (2017) study, along with other research, such as that conducted by Usher et al. (2019) showed positive associations between learners’ motivational levels, self-efficacy, and academic success (Ergun & Avci, 2017; Usher et al., 2019).

The combined roles of self-efficacy and motivation have long been a source of interest for researchers, who examine their influence on achievement within various disciplines. There is evidence from several studies that link low self-efficacy to low motivational levels in college and beyond (Breso et al., 2011; Ergun and Avci, 2017; Sadati et al., 2016). The literature further points out that learners’ perception of their self-efficacy and motivational levels can produce strong persistence to achieve success (Johnson & Stage, 2018; Sadati et al., 2016; Usher et al., 2019). In fact, when learners perceive that they are gaining mastery of coursework, their self-efficacy and motivational

levels can increase, thus producing exemplar work that meets and exceeds course standards (Bandura, 1997; Johnson & Stage, 2018).

Johnson and Stage (2018) “added a layer of complexity to the body of research on college student persistent and engagement” (p. 777) as they examined participants who were drawn from 101 colleges and were representative of the population of public college institutions in the United States. One of the goals in their research was to examine the impact persistence and student engagement in their learning community had on their academic success. Specifically, the authors looked at how curriculum designs and college decision making processes affected academic outcomes and completion rates. The study also looked at several variables that affected students’ chances to complete their degree, including students’ socio-economic status, eligibility for financial aid, and ethnicity and race. From the research findings, one may argue that in online universities, persistent factors, including self-efficacy and motivation, are even more significant because students are in a self-regulated learning environment which is very rigorously assessed (duPaul et al., 2017; Richards, 2016). Study findings support concerns for online administrators, instructors, and learners to work collaboratively in creating appropriate learning communities where self-efficacy and motivation are encouraged (duPaul et al., 2017; Usher et al., 2019). Creating strong associations between self-efficacy, motivation (IM and EM) and self-regulated learning will foster a climate for strong academic success for learners with ADHD in online universities consistent with research findings on similar learner populations from Johnson & Stage (2018), Kizilcec et al. (2017), Sadati et al. (2016) and Usher et al. (2019).

Associations Between Intrinsic and Extrinsic Motivation and Academic Success

Motivation plays a critical role in achieving academic success. Serin (2018) and other authors argue their influence on learners' propensity to achieve academic success. Motivation is described in intrinsic and extrinsic terms (Bruno, 2013; Deci & Ryan, 1985; Serin, 2018). Intrinsic motivation (IM) can be explained as a state of being that propels a learner to perform an activity out of pure interest (Bruno, 2013; Deci & Ryan, 1985; Serin, 2018). An example of this would be a group of learners taking an online course in diversity, to improve their knowledge and understanding of the subject. On the other hand, extrinsic motivation (EM) requires some outside source of reward, for learners to successfully engage in an activity (Bruno, 2013; Deci & Ryan, 1985; Serin, 2018); for example, learners who must take a course that they lack interest in would benefit from lots of praise, feedback, and interaction from the instructor, to encourage sustained engagement.

To distinguish between IM and EM, Deci (1971) conducted a study using the *Soma* puzzle experiment. Described as a Soma puzzle, Deci (1971) conducted an experiment which consisted of 96 participants from the University of Rochester. Two groups were designed, a controlled and an experimental, to test the intrinsic levels of the participants. Each participant took turns in the experimentation room to work on the Soma puzzle which had seven (7) different pieces. The puzzles were thought to have appeal to participants. Participants had ten (10) minutes to complete the puzzle. After this time frame, if the puzzles were not solved, participants were shown how to do it, so they knew it could be done. The experimenter stood outside the experimented room and

observed participants through a one way window. Communication with participants was done through a microphone. When participants' time was up, they had eight (8) minutes of free time to continue working on the puzzle, read magazines, or do anything they liked. The controlled group received verbal praise while the experimental group received monetary reward.

In this experiment, the control group repeatedly showed evidence of higher states of IM to complete the puzzle rather than engaging in an alternative activity (reading magazines), over that of the other group, who received a reward (money) for completing the puzzle. The experiment proved that when the locus of motivation is internal, learners will show a higher level of persistence. An implication of this study is that course instructors should create environments for learning that is intrinsically appealing to learners and provide facilitation that is conducive to engagement and self-discovery (Ambrose et al., 2010). One example would be to incorporate video clips throughout the instructional process to explain new concepts and demonstrate the application of knowledge in practical scenarios to increase competency skills. In this way, adult learners with ADHD could thrive as their learning is being directed by "learning goals, in contrast to performance goals" (Ambrose et al., 2010, p. 72).

Within a learning community, motivation describes the behaviors of students that influence the trajectory of their learning. The research on motivation indicates that when learners do not find a course appealing, they will disengage. In other words, interest, engagement, and persistence will be low which affect their level of academic success (Brown, 2017; Serin, 2018). On the flip side, if learners find the course appealing but do

not feel they are able to gain mastery of it, they may exhibit low states of engagement behaviors, thereby sabotaging their learning.

To ameliorate self-sabotaging behaviors, course instructors may consider establishing clear learning goals that will act as a guide for learners to intentionally use learning strategies to achieve those goals (Britt, 2015; Kaufman, 2015; Wibrowski et al., 2016). By clearly communicating course expectations and learning goals, and providing formative feedback with praise, adult learners with ADHD may find context to focus their efforts towards achieving academic success (Wibrowski et al., 2016). This instructional strategy could work for all learners in a course, regardless of whether they are intrinsically or extrinsically motivated, as studies show an association between goal-directed behaviors and student learning (de Oliveira et al., 2016; Usher et al., 2019).

Online Universities as a Pathway to Higher Education

Online universities have gained global popularity and acceptance as a medium to access higher education by adult learners (Ergun & Avci, 2018; Park & Yun, 2017).

What makes online universities attractive is their flexibility in course delivery asynchronously which appeals to learners who manage other life roles alongside their educational goals as previously mentioned, including family commitments which may hinder students' progress in attaining academic success (Brown, 2017; Gayle, 2014).

Other constraints to pursuing higher education may include finances, technology illiteracy, remote living, and mobility barriers (Britt, 2015; Gayle, 2014; Hope, 2015).

Some learners enter higher education to take advanced degrees (i.e., master's) to benefit from a raise in salary, changing careers, or simply for the intrinsic reward of learning

something new (Budash & Shaw, 2017). As online universities grow in popularity, concerns evoked by educational instructors and administrations include learners' preparedness for using technology via which courses are delivered, learner engagement with instructors and peers, learners' motivational levels, and learners' ability to self-monitor, acquire new knowledge, and evidence new knowledge through formative and summative assessments (Brown, 2017; Gayle, 2014; Kizilcec et al., 2017; Nelson et al., 2012). This concern is warranted as many of these universities face high attrition rates as adult learners drop out prematurely (Britt, 2015; Budash & Shaw, 2017; Hope, 2015).

A growing body of research supports the premise that learner persistence, self-efficacy, and motivation have been strongly associated with learner retention in online universities (Budash & Shaw, 2017; Ergun & Avci, 2017; Hope, 2015; Johnson & Stage, 2018; Kizilcec et al., 2017). To combat the concern of high attrition, many online universities have put in place strategies to promote sustained learning interests, to help adult learners achieve academic success (Budash & Shaw, 2017). Some of the strategies implemented include service learning, internships, peer mentors, embedded multimedia, and orientation programs (Brown, 2012; Brown, 2017; Crews et al., 2015; Politis & Politis, 2016; Stavredes, 2011). In a study conducted by Yorio and Ye (2012) it was found that service learning, defined as "an experience-based approach to education and learning" (p. 9) had a positive effect on learning outcomes and consequently academic success. Moreover, other studies on service learning verify its positive impact on social responsiveness as learners engage with their communities in the learning process (Politis & Politis, 2016; Walters & Hoops, 2015).

Several studies show the utility of internships, peer mentorship programs, and multi-media in enhancing learners' experience in the online environment (Politis & Politis, 2016). Consistent with their research, these strategies could provide a strong context for formative feedback, provide a supportive learning environment, and provide social presence in the classroom, which encourage learner self-efficacy and motivation to persist in academic success (Ergun & Avci, 2017; Politis & Politis, 2016). In his study on orientation programs, Drake (2011) found that orientation programs which addressed social factors had more success in helping students achieve their academic goals; this insight strengthen the use of orientation programs in online universities to help prepare learners to have positive engagement experiences. Indeed, Ranellucci et al. (2015) have found that when students perceived orientation programs as designed to help them successfully adjust to the demands of higher education in an online environment, their level of motivation and subsequent persistence will increase.

Literature Related to Methodology

This study is a non-experimental design and will be using a quantitative approach for investigation purposes. Regression analysis and mediation analysis will be used to examine associations between the key variables of the study which are self-efficacy, motivation, and academic success. These measures are useful for quantifying any predictive associations between the variables (Frankfort-Nachmias & Leon-Guerrero, 2018). Another advantage of using regression analysis in the study is that it has high internal validity as a measure to assess for academic success using students' GPA scores (York et al., 2015).

In a study conducted by Kizilcec et al. (2017) the authors used regression analysis to assess the strength of self-regulated learning strategies on learner behavior and goal attainment. Study participants were a total of 4,831 learners taking online courses, with an average reported age of 32 years, completed a bachelors' degree program or higher, and were enrolled students or working professionals; participants were limited to Latin Americans in the study. Noting that academic success is the goal of learners in online universities, this study brought to light interesting findings concerning how online learners persist in their course work while receiving low levels of support, which is a characteristic of online learning. The study highlighted the behaviors of learners in online universities which support academic success. Goal setting and metacognitive strategies for example, were shown to help learners in online learning environments stay focused and achieve their goals.

Mediation analysis will be used to evaluate the relationships of IM and EM on academic success when self-efficacy serves as a mediating factor. De Oliveira et al. (2016) used mediation analysis to test whether college adjustment mediated the relationship between ADHD symptoms and work self-efficacy. The authors looked at factors that affect adult learners with ADHD which included poor time optimization skills, low organization skills, inattentiveness, and low communication skills. These factors also interfere with learning and academic success for learners in online universities. There were 509 college students who participated in the study, who were recruited from two public universities in Southern Brazil. One of the findings of the

research showed that ADHD symptoms had a huge impact in a negative way on students' work self-efficacy (de Oliveira et al., 2016).

Usher et al. (2019) also used mediation analysis, as aforementioned, to show the mediating effect of self-efficacy on perseverance and academic outcomes across three elementary and four middle schools. Findings from the study showed that self-efficacy partially mediated the effect of persistence on academic achievement. Findings also suggested that perseverance, self-efficacy, and academic achievement were correlated (Usher et al., 2019). The study confirmed empirical findings on the impact of self-efficacy on motivational and persistence factors on academic success. This confirmation in the study supports a similar investigation for this study in exploring whether IM and EM changes academic success for learners in online universities when self-efficacy is introduced as a mediating variable.

To summarize, the study conducted by Usher et al. (2019) focused on elementary and middle school students while the other two research undertaken by de Oliveira et al. (2016) and Kizilcec et al. (2017) used participants in a college or university setting. Two important considerations are highlighted across these three studies. One, for students to achieve academic success, they will need to manage their time well, have good organization skills, practice grit or persistence, have high self-efficacy, and demonstrate positive motivational behaviors in their learning. The second consideration is this: A supportive learning environment is critical to the academic success of learners regardless of their age, gender, culture, and geography. The studies also confirm there is a need for the current research to examine the role of self-efficacy on motivation and academic

success for learners with ADHD studying in online universities, as this perspective has not yet been researched in the literature. This emphasis in this research extended the current body of knowledge on self-efficacy, motivation, academic success, as it related to learners with ADHD studying in online universities.

Summary and Conclusions

The research studies in this chapter send a clear message to the educational and professional learning communities that self-efficacy and motivation are two key constructs that impact academic success. This chapter has provided an extensive review on the inception and process of online universities and the consequent challenges they face as they evolve. Online learners with ADHD are at risk for dropping out of programs offered if their unique circumstances are not addressed in orientation programs, instructional course designs, faculty presence, and advisement availability, for example. Online universities provide education services to diverse learners for a profit (Britt, 2015). Therefore, it is not in their interest when learners do not persist and receive their degree (Britt, 2015; Hope, 2015). A closer examination of strategies that are used to reduce attrition rates would be beneficial to online universities that desire to provide a positive and supportive learning atmosphere to learners who seek higher education for many reasons, including career promotion.

Findings from this study may contribute to the training strategies for online instructors, empowering learners with self-regulated learning strategies to increase their self-efficacy and motivation, promote persistence, and reduce high attrition. In Chapter Three I will present an examination of the methodology used in the study, including

measures used to collect data including the general self-efficacy scale and the academic motivation scale.

Chapter 3: Research Method

Introduction

Research supports the growing popularity of online universities as a good alternative for learners to pursue higher education while balancing other nonacademic roles (Kaufman, 2015; Kezar, 2014; Salvo et al., 2019). Different types of learners seek higher education for many reasons, including becoming more marketable or to advance in their career (Brown, 2017; Budash & Shaw, 2017). Researchers have emphasized the importance of appropriate support systems to help learners to engage, share, and persist towards academic success (De Oliveira et al., 2016; Hope, 2015; Kizilcec et al., 2017; Serin, 2018). To my knowledge, though, researchers had not yet examined whether an association between self-efficacy, motivation (IM and EM), and academic success existed for learners with ADHD in online universities.

To address this gap in the literature, I examined whether this association existed. In conducting the study, I wanted to add to the body of literature on how to increase academic success for learners with ADHD in online universities via novel learning and instructional strategies (De Oliveira et al., 2016; Hope, 2015; Kizilcec et al., 2017; Serin, 2018). The predictor variables were self-efficacy and motivation (IM and EM), and the dependent variable was academic success. I used a quantitative, nonexperimental correlation design to facilitate the analysis. In this chapter, I discuss the research design, methodology, population of interest, instruments utilized to gather and measure data, sampling procedures, and statistical measures used to explain data findings. Additionally,

Chapter 3 includes a discussion of ethical considerations and threats to validity of the data findings.

Research Design and Rationale

In this research study, I used a quantitative nonexperimental, correlational design to examine the associations between the variables. In behavioral science, using a nonexperimental correlational design is appropriate for discovering whether there is an association between two variables (Frankfort-Nachmias & Leon-Guerrero, 2015). In addition, I examined whether self-efficacy mediated the association between motivation (IM and EM) and academic success in learners with ADHD in online universities. Results of this analysis are presented in Chapter 4.

Regression statistical analysis provides the opportunity to examine associations between at least two variables (Frankfort-Nachmias & Leon-Guerrero, 2015; Warner, 2013). For this research, I used regression analysis and mediation analysis to investigate the RQs. The independent variables were self-efficacy and motivation (IM and EM). The dependent variable was academic success, measured by self-reported GPA. I used the Academic Motivation Scale (AMS) developed by Vallerand et al. (1992) to measure IM and EM in higher education. GPA scores were used to measure academic success. Additionally, The General Self-Efficacy (GSE) scale developed by Schwarzer and Jerusalem (1995) was used to measure students' general self-efficacy. An online survey was administered to participants, which included a self-report response of a diagnosed ADHD. I used SurveyMonkey to facilitate the data collection process online to ensure anonymity of respondents. The aim of using these various measures to obtain and analyze

data was to examine the presence of an association between the variables to provide guidance to online university leaders and their partners on how to increase academic success for learners with ADHD at these institutions.

Methodology

In this section, I describe the population of interest and sampling procedures. Then, I describe the process for recruitment, participation, and data collection plan and data analysis plan. Finally, I discuss how the study's variables were operationalized.

Population

The target population for this study included learners enrolled in an online university. Participants self-identified as having an official diagnosis of ADHD. The strategic plan for optimal recruitment of participants to the study included accessing eligible participants from Walden University's participation pool and online education groups. Walden University has approximately 48,000 enrolled students (datausa.io, 2019). It also has a diverse student population of working professionals, with programs being offered internationally, potentially having a good representation of learners with an ADHD diagnosis. In fact, at the time of this study, there are 290 online learners with a reported diagnosis of ADHD who are registered with the Office of Disability Services at Walden University (Roney, 2020). This number of learners seeking accommodations (290) represents 15% of the total number of learners who are registered with the Office of Disability Services (Roney, 2020). This number also excludes other diagnoses including PTSD which affects learners' ability to stay focused. The percentage of learners with

ADHD who are registered with the Office of Disability Services point to the importance and relevance of the focus of this study.

As a criterion for inclusion in the study, participants had to be aged 18 years and older. Other criteria for inclusion required participants to be or have been enrolled in an online university degree-seeking program at the bachelor's or master's level. Participants were required to consent to the study before they moved forward with self-reporting a diagnosis of ADHD. Learners who did not fit participation criteria were excluded from the study. As an example, participants enrolled in certificate programs or other non-degree seeking programs were excluded from the study. This exclusion allowed the study to correctly examine those learners exposed to rigorous studies in a bachelor's or master's degree seeking program.

Sampling and Sampling Procedures

Sampling is a crucial step of the research process. In quantitative studies the sample strategy must be amenable to the study. Chen (2016) suggested that the sample size should reflect representativeness of the population being studied. Consistent with Chen's approach to sampling, I used a convenience sampling strategy to reach potential participants who were willing to participate in the study (Babbie, 2017; Chin, 2016). According to Babbie (2017), this strategy is appropriate when the researcher has knowledge about the population and the issues that are affecting the study population and knows the goal of the study. Convenience sampling provides the opportunity for the researcher to reach available participants, provides each participant the same opportunity

to participate in the study, reduces researcher bias, promote high internal and external validity, and supports the generalizability of findings (Chin, 2016; Babbie, 2017).

To obtain the minimum sample for the study, *a priori* power analysis was performed to conduct regression analysis. This approach is commonly used in behavioral science to establish the minimum sampling size to be used in research (Frankfort-Nachmias & Leon-Guerrero, 2015). To achieve a minimum sampling size, the effect size, alpha level, power, and predictor variables were used to establish a power of 0.80 or 80% confidence level in the reported data. An 80% confidence interval (CI) level describes the probability that the sample size will fall within this parameter (Frankfort-Nachmias & Leon-Guerrero, 2015).

An even larger sample size gives a more precise reflection of the population under investigation which increases the confidence levels of the data (Pek & Wu, 2015). Therefore, a second power level of 99% or .99 CI was set to determine the minimum sample size with the probability of committing a Type 1 error at less than or equal to 5%, the p-value (alpha) that is the standard threshold for behavioral science research studies (Warner, 2013). The p-value represents the probability that the null hypothesis is rejected at the 0.05 threshold level (Frankfort-Nachmias & Leon-Guerrero, 2015; Warner, 2013). In other words, there is only a 5% likelihood of rejecting the null hypothesis, when it is correct (Frankfort-Nachmias & Leon-Guerrero, 2015). Examples of quantitative studies cited in this research whose authors used the 0.05 threshold level included Kizilcec et al. (2017) and Usher et al. (2019). The greater the effect and the larger the sample size, the

greater the likelihood that the null hypothesis will be rejected (Frankfort-Nachmias & Leon-Guerrero, 2015; Warner, 2013).

I sought in this study to establish a medium effect size ranging between .15 and .30 to explain the strength of the relationship between the variables (Frankfort-Nachmias & Leon-Guerrero, 2015; Warner, 2013). Coefficients below .15 would reflect weak associations, coefficients between .15-.30 represent moderate associations, and any coefficient .50 and above would reflect strong associations (Frankfort-Nachmias & Leon-Guerrero, 2015). For the purposes of running a power analysis, a moderate effect size of .15 was chosen. This approach is consistent with research in behavioral sciences where data have not yet been obtained to calculate the actual effect size (Frankfort-Nachmias & Leon-Guerrero, 2015). In addition, consistent with my decision to use a moderate effect size, other studies which measured self-efficacy and motivation have reported effect sizes ranging from small to large (Alkis & Taskaya-Temizel, 2018; Kizilcec et al., 2017; Nazer et al., 2018).

To calculate the minimum sample size at an 80% and 99% CI level respectively, *a priori* power analysis using the power analysis software 3.1.9.2 was performed: alpha level was set at .05 ($\alpha = .05$) which meant the probability for making a type 1 error was less than or equal to 5%. Power level was set at 80% (.80) which meant that there was an 80% probability chance of achieving statistical significance. The magnitude of the effect size was set at .15, representing a medium effect. The predictor variables used were self-efficacy and motivation (IM and EM). Running regression analysis, the minimum sample size that was needed in the study was 43 participants. The 80% CI level yielded a precise

estimate of 43 participants with an implied precaution for how findings may be generalized to the wider population group (Pek & Wu, 2015). By adjusting the power level to .99, the analysis yielded a sample size of 107 participants.

To summarize, *a priori* power analysis showed a minimum of forty three (43) participants were needed for the research study at a power level of .80 (80%). At a power level of .99 (99%) the maximum sample of participants needed for the study was 107. The goal of this research was to obtain the maximum sample reported at the 99% CI which supported greater confidence in the data findings (Pek & Wu, 2015). However, the final sample collected to conduct data analysis was N=52.

Procedures for Recruitment, Participation, and Data Collection

Recruitment

Once I obtained approval from Walden University's Institutional Review Board (IRB) (11-30- 20- 0291146) to conduct the research study, I recruited participants through the institution's pool of research participants. The invitation to participate in the study that I posted on Facebook is in Appendix A. The invitation to participate in this research was sent out by the University's administrator who managed the research participant pool. The recruitment invitation included a brief introduction of myself and contact information, the purpose of the study, criteria for participation in my study, confidentiality, and informed consent (Fisher, 2017).

In addition to Walden University's research pool, participants were also recruited through closed education online groups on Facebook. The same eligibility requirements applied to volunteer participants from closed education online groups. Participants from

closed online education groups were reached via invitations posted on their page. An embedded link to access survey was provided in each posting to increase volunteer participation. The survey was housed on Survey Monkey's platform which provided anonymity to volunteer participants; this strategy was also used to increase confidentiality.

Consistent with criteria for participation, participants were enrolled at least half-time and working towards a bachelor's or master's degree. Participants were learners aged 18 years or older and pursuing their degree at an online university. Study participants were able to access the embedded link to the consent form in the invitation which took them directly to the consent page on Survey Monkey. The consent page provided information on the purpose of the study, rights and responsibilities of participants, and provided an approximate time frame to complete the survey. The consent form also explained inclusion criteria, with a reminder of those inclusions after they consented to participate in the study. All volunteer participants met the study's inclusion criteria.

Once participants consented to participate in the study, they were taken to the consent form. The consent form included the ethical standards governing the study as delineated in the APA code of ethics (2013) and in Fisher (2017). In this document, students were informed that participation was voluntary and gave them the right to withdraw their participation at any time without penalty. Participants who agreed to the consent document provided an electronic signature. Once the signature was obtained, they were allowed to move forward to complete the survey (see Appendix B).

Demographic questions asked include participants age, degree pursued, a diagnosis of ADHD, and self-reported GPA score. Participants were debriefed at the end of the survey to acknowledge their participation and support of this research study.

Data Collection

Research confirms the growing popularity of using online surveys in quantitative research (de Bruijne & Wijnant, 2014). The reason online surveys are so popular is that researchers, like me, can collect data more easily when compared to the paper and pencil format, and allow researchers to reach more participants in a shorter time frame (Khazaal et al., 2014). This format also guarantees anonymity of participants which is an ethical requirement in research studies. Additionally, anonymity allows participants to be open and transparent in their responses which help to achieve reliability of findings (Teitcher et al., 2015). For my study, data collection was done through Survey Monkey. Survey Monkey is an online service that provides researchers with the tools to reach their participants anonymously, gather data, and review the data.

The survey link was disabled after data collection for this research study ran for 5 months, yielding a final total of N=52 participants for data analysis, once the data were cleaned. Collected data would be stored for a period of 5 years, as required by Walden University. Data stored on my computer drive would be password protected to ensure privacy and confidentiality. SPSS, a statistical software, was used to analyze the data.

Instrumentation and Operationalization of Constructs

This study collected data using the following measures: The General Self-Efficacy Scale; the Academic Motivational Scale; Grade Point Average Scale; and the Demographic Questionnaire. Details about these measures follow:

Demographic Questions

Demographic questions facilitated the obtainment of information on study participants' age, enrollment status, degree program, ADHD self-diagnosis, and whether they were on a stimulant. These questions were used to capture participants' information and used to evaluate students' self-efficacy and motivation (IM and EM) in their online learning program of study:

The operational definitions for these variables were as follows:

Age: participants reported their current age. Age is considered a factor that influences motivational beliefs (Park & Yun, 2017).

Enrollment status: This is defined as half-time or full time enrollment in a bachelor's or master's level degree program. Participants were asked to state whether they were enrolled half time or full time and if they were bachelor's or master's level seeking students.

Degree program: The definition of this variable is a bachelor's or master's degree. Knowing whether participants were pursuing a bachelor's or master's degree provided descriptive analysis relating to motivation and self-efficacy beliefs (Park & Yun, 2017).

ADHD self-report: An ADHD self-report in this context is defined as those individuals who self-report whether they have been professionally diagnosed with ADHD

at some point in their lifetime. Participants were also asked whether they were taking stimulant medication to treat the symptoms of ADHD. Questions are listed in Appendix B.

General Self-Efficacy Scale

Developed by Schwarzer and Jerusalem (1995) the GSES is translated in 28 languages, including Spanish (Carbonell-Baeza et al., 2010; as cited in Luszczynska et al., 2005). Thus, this measure has utility across several cultures. This is an important consideration as online universities serve a diversified student population. The original items measured by the scale were 20, which was later adjusted to 10 items, and is measured on a 4-point Likert scale (1= not at all true; 2= hardly true; 3= moderately true; 4 = exactly true). The GSES is designed to measure personal perception of self-efficacy within the context of daily life challenges which may impact career, interrelationships, family life, and school (Schwarzer, 1995). The following is an example of the type of question participants will answer which will be on 4-point Likert Scale: *It is easy for me to stick to my aims and accomplish my goals.*

The GSES scale is unidimensional and shows internal reliability, with a *Cronbach's alpha* ranging from .76 to .90 in studies conducted in 23 countries (Schwarzer & Jerusalem, 1995). The GSES is also normed in Spanish, Korean, and German (Luszczynska et al., 2005; Schwarzer, 1995). In a study conducted by Unsworth and Mason (2012) the authors reported that the GSES showed high internal reliability, with a *Cronbach's alpha* of .90 at pre-training and a *Cronbach's alpha* of .92 at post-training.

Academic Motivation Scale

The Academic Motivation Scale (AMS) developed by Vallerand et al. (1992) measures learners' intrinsic and extrinsic motivational levels which has a high internal consistency, validated with the use of Cronbach's alpha. The measure also reports a high internal consistency in its use as a tool in research studies involving motivation (Staribratov & Babakova, 2019; Vallerand et al., 1992). The AMS is also culturally normed which validated its utility in quantitative studies which are inclusive of various racial and ethnic groups (Staribratov & Babakova, 2019).

Cronbach's alpha reported for IM subscales ranged from .85 to .88 in a pre-test trial while EM reported alphas ranging from .72-.91 in the pre-test; in a follow up post-test IM alphas reported ranged from .84-.90, while EM was reported a range of .78-.89. Overall, the AMS performed very well in test/retest trials to validate its consistency as a measure to evaluate motivational behaviors of learners in pursuing post-secondary studies (Vallerand et al., 1992).

The AMS has 28 items and is scored on a 7-point Likert scale, with responses ranging from 1= not at all, to 7= exactly (Vallerand et al., 1992). Four of the subscales assess types of external motivation (amotivation; external regulation; introjections; and identification) while the remaining three assess for internal motivation (to know; to accomplish things; and to experience stimulation). The scale is used to capture data concerning the behaviors and experiences of learners who pursued higher education. According to my RQ's I will be using one overall AMS score, to assess the motivational behaviors of adult learners in online universities, which is comparable to the way in

which other studies, such as Staribratov and Babakova (2019), use Vallerand et al.'s (1992) AMS scale. A sample question measuring subscale IM on the AMS scale is as follows: *I experience pleasure and satisfaction while learning new things*. A sample question measuring subscale EM on the AMS scale is as follows: *I think that a college education will help me better prepare for the career I have chosen*.

Several studies validate the use of the AMS scale to assess for motivation in college students. In a study by Staribratov and Babakova (2019), they used Vallerand et al. (1992) AMS scale to assess motivation behaviors in Bulgarian students. Staribratov and Babakova (2019) found that the AMS scale was a comparable model to assess motivation behaviors in Bulgarian students, reporting an alpha of .95.

In another study conducted by Novotny, Brucknerova et al. (2019) the AMS was used to assess its validity on non-traditional students in higher education and to determine differences in academic motivation between traditional and non-traditional students in a Czech university environment. The authors designed the Czech version of the AMS and checked for comparability against the original version of the AMS, using exploratory factor analysis. Findings suggested that the Czech AMS was comparable to the English version, reporting an alpha of .97. This study also confirmed the validity of the AMS as a culturally appropriate tool to measure academic motivation in an online or non-traditional setting. The two studies cited, show the utility of the AMS scale as a useful tool to assess the motivational behaviors of adult learners, eighteen and older in online universities.

Grade Point Average Scale

Self-reported GPA will be used to measure the academic performance for each participant in the study. GPA is a normative way to measure students' academic achievement and is the most reported way to measure GPA as seen in several peer-reviewed studies (duPaul & Jimerson, 2014; Hwang et al., 2018; Salvo et al., 2019; York et al., 2015). In the current study, participants will self-report their GPA scores which will be used to assess their academic success. It will be assumed that GPA self-reported is un-weighted, which does not take into consideration difficulty levels in a course. Walden University operates on a 4.0 scale. A limitation with this strategy is that participants may give inaccurate information regarding their score. Additionally, I will not be able to validate the information against student records. However, research suggests that anonymity increases the accuracy of GPA self-reports (Cassady, 2000). This question will be addressed in the demographic questionnaire (see Appendix B).

Operationalization of Variables

Independent Variables. The first variable, self-efficacy, was measured using the GSES which asked participants to respond to 10 questions and was scored on a 4-point Likert scale. The second variable- motivation- was measured using the AMS. Participants were asked to answer 28 questions, scored on a 7-point Likert scale.

Operational definitions for the independent variables are as follows:

Self-Efficacy: This construct will be defined as learners who believe they can complete their degree program (the task) measured by the GSES (Bandura, 1986; Schwarzer & Jerusalem, 1995).

Motivation: This construct is defined as learners who have the desire to complete an academic related task and measured by the AMS (Ryan & Deci, 1986; Vallerand et al., 1992).

Dependent Variable. I measured academic success, the dependent variable, by students' overall GPA scores. Students self-reported their GPA score. This score was used to measure the academic success of learners in online universities. In operationalizing this variable, I drew from York et al.'s (2015) definition of academic success as a student's success in achieving their academic goals measured by self-reported GPA scores.

Data Analysis Plan

The current study used linear regression analysis and mediation analysis to analyze the data. The data collected from the demographic questions, the AMS, GSES, and GPA scales were retrieved and screened to remove missing or incomplete responses from the sample to be used. Results were interpreted and analyzed using SPSS software which provided descriptive statistics on the variables used in the study.

As previously mentioned, SPSS statistical software was used to conduct regression analyses utilizing the variables self-efficacy, motivation (IM and EM), and academic success. The SPSS software was also used to conduct mediation analysis on RQs 4 and 5, to test the hypotheses focusing on the mediating role of self-efficacy on motivation as a predictor of academic success. The objective of this analysis was to assess the interaction between motivation (IM and EM) and academic success, and the strength of the impact of motivation when self-efficacy was introduced as the mediator

variable. The mediation model developed by Preacher and Hayes (2004) was used to conduct the analysis, which only require either *a* or *b* pathway to have statistical significance. The study lends itself to a non-experimental design which is appropriate for studies that do not involve manipulation of an independent variable (Allwood, 2012).

The following hypotheses were tested for any statistically significant associations between self-efficacy, motivation (IM and EM), and academic success. The RQs and hypotheses for the study are as follows:

RQ1: To what extent is there an association between self-efficacy, as measured by the General Self-Efficacy Scale, and academic success as measured by self-reported overall GPA, in adult online learners with ADHD?

*H*₀1: Self-efficacy, as measured by the General Self-Efficacy Scale, is not a significant predictor of academic success, as measured by self-reported overall GPA, in adult online learners with ADHD.

*H*₁1: Self-efficacy, as measured by the General Self-Efficacy Scale, is a significant predictor of academic success, as measured by self-reported overall GPA, in adult online learners with ADHD.

Regression analysis was conducted to test the predictive role of self-efficacy (independent variable) on academic success (dependent variable).

RQ2: To what extent is there an association between academic intrinsic motivation, as measured by the Academic Motivation Scale, and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀₂: Academic intrinsic motivation is not a significant predictor of academic success in adult online learners with ADHD.

H₁₂: Academic intrinsic motivation is a significant predictor of academic success in adult online learners with ADHD.

Regression analysis was also performed to examine the predictive nature of intrinsic motivation (independent variable) on academic success (dependent variable).

RQ3: To what extent is there an association between academic extrinsic motivation, as measured by the Academic Motivation Scale, and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀₃: Academic extrinsic motivation is not a significant predictor of academic success in adult online learners with ADHD.

H₁₃: Academic extrinsic motivation is a significant predictor of academic success in adult online learners with ADHD.

As in RQ2, regression analysis was also performed to examine the predictive nature of extrinsic motivation (independent variable) on academic success (dependent variable).

RQ4: To what extent does self-efficacy mediate the relationship between academic intrinsic motivation and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀₄: Self-efficacy does not mediate the relationship between academic intrinsic motivation and academic success in adult online learners with ADHD.

H₁₄: Self-efficacy does mediate the relationship between academic intrinsic motivation and academic success in adult online learners with ADHD.

Mediation analysis was used to answer this research question. Self-efficacy is the mediating variable (MV), intrinsic motivation (IM) is the independent variable (IV), and academic success is the dependent variable (DV). Preacher and Hayes (2004) mediation analysis model was used to test mediation hypotheses (Madhavan, 2018; Warner, 2013). The purpose for conducting a mediation analysis for this question was to explain whether self-efficacy influenced intrinsic motivation, and then, to explain whether intrinsic motivation in turn, influenced academic success.

RQ5: To what extent does self-efficacy mediate the relationship between academic extrinsic motivation and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀₅: Self-efficacy does not mediate the relationship between academic extrinsic motivation and academic success in adult online learners with ADHD.

H₁₅: Self-efficacy does mediate the relationship between academic extrinsic motivation and academic success in adult online learners with ADHD.

As for RQ4, mediation analysis was performed for this research question. Preacher and Hayes (2004) mediation analysis model was also used in this analysis to test the hypothesis whether self-efficacy mediated the relationship between extrinsic motivation and academic success.

Mediation analysis is an appropriate model that can yield statistical findings to provide answers to the level of impact the MV may have on the level of interaction between the other variables (Warner, 2013). In other words, mediation analysis is used to explain the relationship between the predictor variable and the outcome variable (Warner,

2013). Mediation analysis is also useful for determining the strength of the association between an independent variable and a dependent variable (Madhavan, 2018; Warner, 2013).

Linear normality of the data was assessed via Q-Q plot standardized residuals and examining the distribution of points along the regression line. Shapiro-Wilk test was also conducted to assess the normal distribution of the data. Boxplot analysis was performed to assess for skewness and to explore the presence of univariate outliers (Laerd Statistics, 2021).

Threats to Validity

Internal Validity

Threats to internal validity relate to the process of the research enquiry which may compromise the interpretation and analysis process (Babbie, 2017; Burkholder et al., 2016). A potential threat to validity is selection of participants (Burkholder et al., 2016). Threats to validity also include instrumentations used, maturation, history, and attrition. In my study I had no control over who participated in the research or control over their responses. Potentially, responses could be overinflated which would impact the research findings and their application to the broader online university population (Babbie, 2017; Kirkwood & Price, 2013). In addition, I conducted the analysis using a small sample size which could impact the generalizableness of research findings (Burkholder et al., 2016). To reduce internal threat to validity, clear inclusion criteria were given. Additionally, by using an anonymous survey to gather data, it was hoped that participants would be authentic in their responses.

It is important to control internal threats to validity, to ensure that study can be replicated if needs be by other researchers (Babbie, 2017; Burkholder et al., 2016). One other threat to internal validity is trustworthiness. Saldaña (2016) noted the importance of using measurements that align with RQs to ensure trustworthiness of findings. The GSES and the AMS scales are established measurements that have been tested for their validity in quantitative research studies. Additionally, regression analysis and mediation analysis are appropriate tools for examining potential associations between variables in a scientific way (Warner, 2013).

External Validity

External validity has to do with the significance at which the data can be generalized across various populations (Burkholder et al., 2016). One way to reduce threats to external validity is to use measures that are normed across several cultures (Babbie, 2017; Burkholder et al., 2016; Saldaña, 2016). For my research, I used measures (GSES, MSA, and GPAS) that have been culturally normed and validated. Another way to reduce external threats is to provide participants with a standardized questionnaire in the survey (Burkholder et al., 2016). I followed this protocol where all participants received and answered the same questions in the survey. Another way to reduce threats to external validity is to make sure that surveys that have incomplete data be excluded from data analysis. I followed this approach by excluding incomplete data from the analysis. One limitation to generalizability is that participants will be sourced primarily through Walden University and participation is limited to bachelors and masters level students only.

Ethical Procedures

Ethics refers to one's required moral obligation in the process of conducting research involving human participants as the research process evolves (Babbie, 2017; Burkholder et al., 2016; Fisher, 2017). The National Institutes of Health (2008) also explains to researchers their responsibility in reducing risks and unethical practices when they conduct research. These concerns for ethical behaviors serve as guidance in choosing appropriate measurements and following protocols to protect participants who volunteer for my study. By using the survey instrument to gather data, I increased confidentiality and achieved anonymity of study participants. This additional layer of security also served to influence volunteerism and honest responses to questions (Babbie, 2017; Burkholder et al., 2016; Fisher, 2017).

Studies involving the participation of human volunteers must gain the approval of the Institutional Review Board (IRB). Before I contacted any potential candidate for the study, I obtained consent from Walden University's IRB which is delegated the responsibility of ensuring that all research study meet ethical standards and federal regulations relating to human participants. The IRB also is responsible for ensuring that no harm is done to study participants. To reduce harm to my participants, they were informed that they may withdraw at any time if they got uncomfortable with the questions. Questions posed in the survey did not provide any risks to participants.

Participants' Consent

Potential participants to the study were recruited via Walden's research study participant pool. The invitation letter along with the embedded link was posted in the

pool for anyone who may be interested in participating in the study. Study participants were also recruited from online education university groups on Facebook with an invitation sent from Survey Monkey's platform, explaining the purpose of the study with an invitation to participate. Those who were interested simply clicked the link and was taken directly to the survey. I explained the purpose of the research study in every communication (see, for instance, the invitation letter in Appendix A). This process enabled interested participants to know the purpose of the study and its' contribution to the extant literature. Information on accessing the survey was provided in every communication to expedite the process for those who agree to participate. All participants had to electronically sign a consent form before they were allowed to move forward with the survey. The consent form covered the purpose of the study, the rights and responsibilities of the participants, assurance of confidentiality, anonymity considerations, and compensation considerations; my contact information was provided in this document also, consistent with IRB requirements.

In accordance with ethical standards for data collection as delineated in the APA (2013) data will be stored on a private personal computer for five (5) years, after which they will be appropriately destroyed (deleted from all hard drive and back up files). As I am using Survey Monkey to collect data, I will not have personal information of participants; this significantly reduces concerns for confidentiality.

Summary

Chapter Three explained the methodological approach taken to conduct this study. A non-experimental quantitative design was chosen to test the study's hypotheses as I

sought to examine associations between the variables self-efficacy, intrinsic and extrinsic motivation, and academic success of learners with ADHD in online universities. The research design which used regression analysis and mediation analysis to analyze data findings was discussed. Additionally, I provided information on the utility of the instruments and measures used to gather data and analyzed data. The RQs and their corresponding hypotheses were also discussed in the chapter. Other considerations pertaining to the study, including threats to validity (internal and external), ethics, forms, recruitment, and participation procedures were also discussed.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to examine the associations between self-efficacy, motivation (IM and EM), and academic success of learners with ADHD in online universities. I used the GSES, AMS, and GPA score to operationalize the variables. Data were analyzed using multiple regression analysis. This study adds to the existing literature in that it looked at academic success of learners who struggle with ADHD who are pursuing a bachelor's or master's degree in online universities. This study addressed the following RQs and hypotheses:

RQ1: To what extent is there an association between self-efficacy, as measured by the General Self-Efficacy Scale, and academic success as measured by self-reported overall GPA, in adult online learners with ADHD?

H_{01} : Self-efficacy, as measured by the General Self-Efficacy Scale, is not a significant predictor of academic success, as measured by self-reported overall GPA, in online learners with ADHD.

H_{11} : Self-efficacy, as measured by the General Self-Efficacy Scale, is a significant predictor of academic success, as measured by self-reported overall GPA, in online learners with ADHD.

RQ2: To what extent is there an association between academic intrinsic motivation, as measured by the Academic Motivation Scale, and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

*H*₀₂: Academic intrinsic motivation is not a significant predictor of academic success in online learners with ADHD.

*H*₁₂: Academic intrinsic motivation is a significant predictor of academic success in online learners with ADHD.

RQ3: To what extent is there an association between academic extrinsic motivation, as measured by the Academic Motivation Scale, and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

*H*₀₃: Academic extrinsic motivation is not a significant predictor of academic success in online learners with ADHD.

*H*₁₃: Academic extrinsic motivation is a significant predictor of academic success in online learners with ADHD.

RQ4: To what extent does self-efficacy mediate the relationship between academic intrinsic motivation and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

*H*₀₄: Self-efficacy does not mediate the relationship between academic intrinsic motivation and academic success in online learners with ADHD

*H*₁₄: Self-efficacy does mediate the relationship between academic intrinsic motivation and academic success in online learners with ADHD.

RQ5: To what extent does self-efficacy mediate the relationship between academic extrinsic motivation and academic success, as measured by self-reported overall GPA, in adult online learners with ADHD?

H₀₅: Self-efficacy does not mediate the relationship between academic extrinsic motivation and academic success in online learners with ADHD.

H₁₅: Self-efficacy does mediate the relationship between academic extrinsic motivation and academic success in online learners with ADHD.

Instruments used in the data collection process included a demographic questionnaire, GSES, GPA score, and AMS, administered in an anonymous online survey using SurveyMonkey. The research sample consisted of participants with an ADHD diagnosis who were 18 years and older and who were pursuing a bachelor's or master's degree in an online university. In this chapter, I present the results obtained from the data collection and analysis process to address the RQs. The results of this study provide more insight on the significance of the association between the variables and expand knowledge on the role of self-efficacy as a mediator in the relationship between motivation (IM and EM) and academic success of learners in online universities.

Data Collection

The data collection period totaled 6 months. I first launched the survey on November 24, 2020, via SurveyMonkey to participants who met study criteria. The survey closed on March 25, 2021, with a sample size of 156 participants. When the data set was cleaned and reviewed, the total number of participants who reported having an ADHD diagnosis was below the minimum sample size for data analysis ($N = 43$). After data were cleaned and screened, only a sample of 33 cases could be used. Of the total sample size, 123 cases were invalid due to incomplete responses: missing or inaccurate GPA scores, missing ADHD diagnosis, missing age, missing values for GSES, and

missing values for AMS. To obtain the minimum sample size for the study, I reopened the survey on April 24, 2021. The survey ran from April 24 until May 5, 2021, yielding a final sample size of ($N = 52$) for data analysis, which surpassed the minimum required sample size ($N = 43$) for the study obtained from the power analysis described in Chapter 3. I used convenience sampling by reaching out to participants in Walden's Participant Pool and from online universities' Facebook groups. The survey questionnaire administered on SurveyMonkey yielded several pertinent insights.

Results

Descriptive Statistics

Descriptive statistics for the demographic variables used in the study are presented in Table 1. The sample included 36 women (69%) with an average age of 37.2 years old ($SD = 11.9$). The higher proportion of female participants in the sample is consistent with findings from other research studies (Budash & Shaw, 2017). Most of the participants identified as Caucasian/European ($N = 40$, 77%). The sample mean GPA was 3.7 ($SD = 0.32$). The standard deviation for the year enrolled, 2019, was 3.5.

Table 1

Descriptive Statistics for Demographic Variables

Variable	<i>N</i>	%
Gender		
Female	36	69.2
Male	16	30.8
Race/Ethnicity		

African	1	1.9
American/Black		
Asian/Pacific Islander	4	7.7
Caucasian/European	40	76.9
Hispanic/Latino	4	7.7
Other	3	5.8
Degree		
Bachelor's	21	40.4
Master's	30	57.7
Stimulant use		
Yes	27	51.9
No	25	48.1

Note. $N = 52$. Two participants did not give their age. Eleven participants did not give their enrollment year.

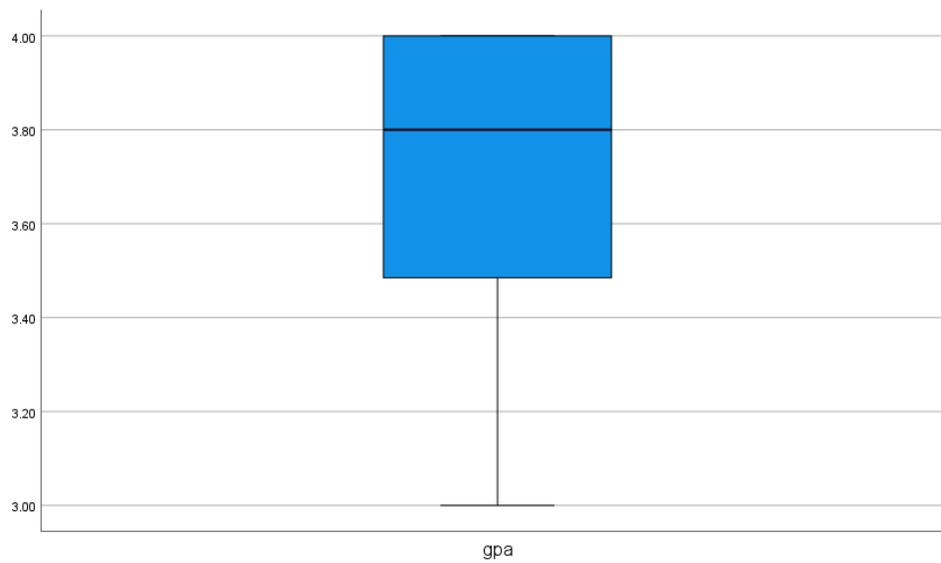
Distribution of Variables

I examined the distribution of variables using boxplots, skew statistic, and the Shapiro-Wilk test of normality. Boxplot analysis is useful for assessing for skewness and to explore the presence of univariate outliers (Laerd Statistics, 2021). As depicted in Figures 1-3, boxplot analysis was performed for each variable to assess for outliers, and show the shape of the distribution of GPA, age, and enrollment year. From the boxplot analysis conducted, no outliers were found in either GPA or age. For year enrolled, boxplot analysis reported six outliers (including three extreme outliers) at the lower end in year enrolled. However, this extreme is expected in the data, as online universities grew in popularity in the early 2000s to present, with the advent of the world wide web.

Therefore, these outliers were included in the study to reflect the progressive growth of online universities. Assessment of the skew statistic for each variable revealed all values were within -1 to +1, which indicates no significant departure from normality (Hair et al., 2014).

Figure 1

Boxplot of GPA



Note. GPA = grade point average.

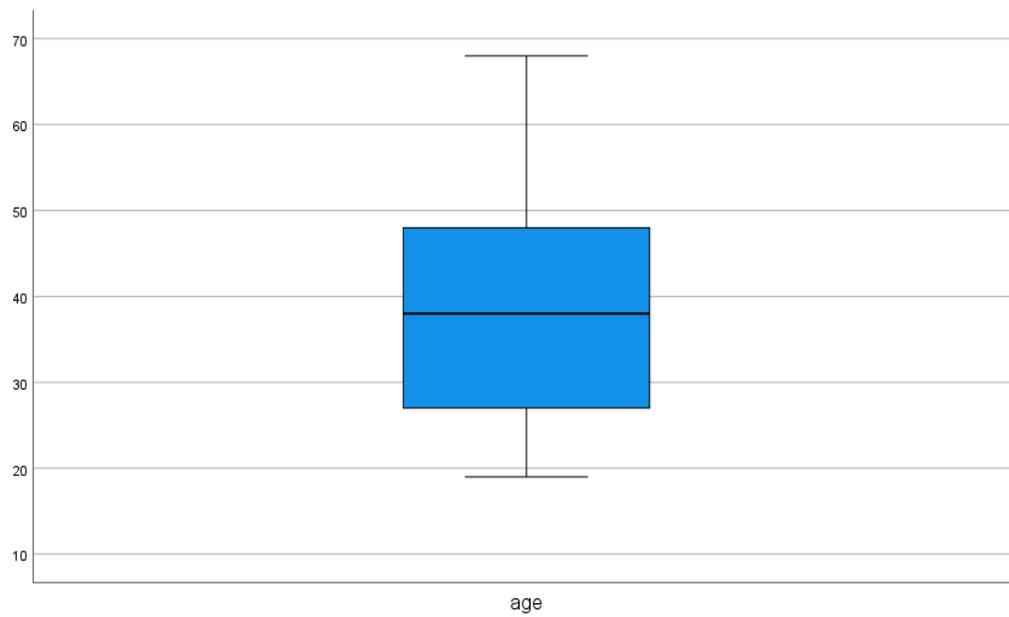
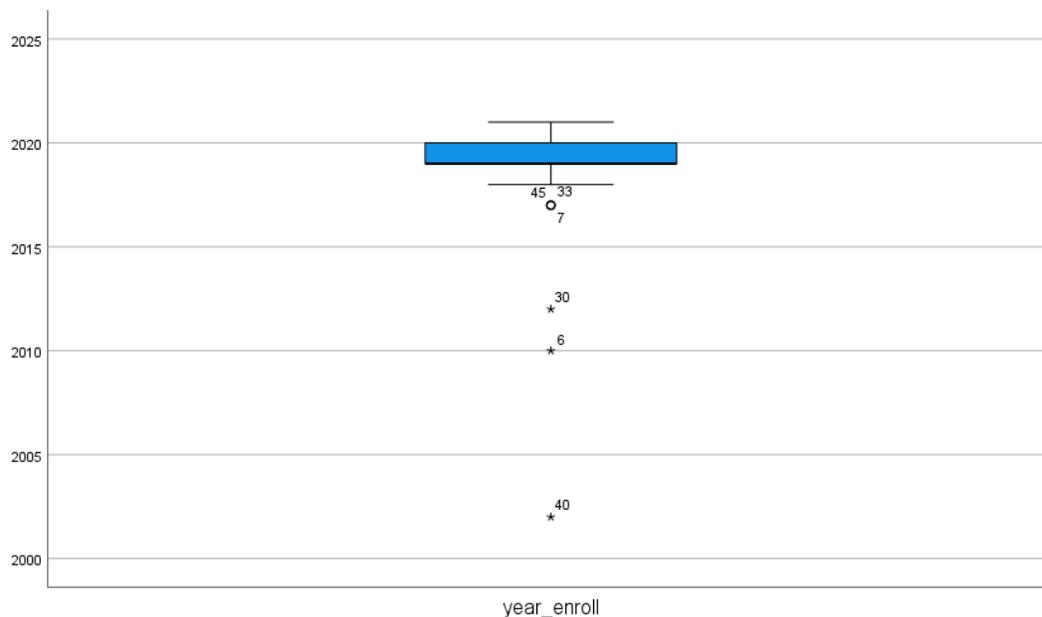
Figure 2*Boxplot of Age*

Figure 3*Boxplot of Year Enrolled*

A Shapiro-Wilk test was conducted as an additional method to assess distribution. A $p < .05$ for the Shapiro-Wilk suggests the data may not be normally distributed while $p > .05$ indicates the data is normally distributed. As demonstrated in Table 2, age ($p = .08$), self-efficacy ($p = .64$), intrinsic motivation ($p = .66$) and extrinsic motivation ($p = .12$) have p values above $.05$. The results of the skew statistic suggest these variables are normally distributed. A value of $p < .001$ for GPA suggests it is not normally distributed; however the skew statistic ($-.64$) and the fact the mean and median of GPA are close in value suggest the variable may be treated as normal for analysis.

Table 2*Test of Normality*

 Shapiro-Wilk

Variable	Statistic	df	<i>p</i>
Age	.95	39	.08
Year enrolled	.57	39	.000
GPA	.88	39	.000
Self-efficacy	.98	39	.64
Intrinsic	.98	39	.66
Extrinsic	.96	39	.12

Note. GPA = grade point average.

Descriptive Statistics for Variables of Interest

The General Self-Efficacy scale provides an opportunity to respondents to rate their own self-efficacy beliefs and to assess their coping strengths associated with life stressors, such as attending university online (Bandura, 1979). Self-efficacy was calculated by summing the numeric values of answers to all the 10 GSES questions. Intrinsic motivation was calculated by summing the numeric values of answers to questions 2, 9, 16, 23, 6, 13, 20, 27, 4, 11, 18 and 25 of the CEGEP. Extrinsic motivation was calculated by summing the numeric values of answers to questions 3, 10, 17, 24, 7, 14, 21, 28, 1, 8, 15 and 22 of the CEGEP. Questions 5, 12, 19 and 26 were not used in calculating intrinsic or extrinsic motivation because they are amotivation measures. Answers to the Academic Motivation Scale questions (also referred to as the CEGEP) were recoded into numeric values. This scale assessed the motivational intrinsic and extrinsic levels of students in degree seeking college students.

An independent samples t-test was run to examine whether there was a significant difference between participants on medication and those not on medication using the

variables under study (GPA, IM, EM, & SE). No significant differences emerged from this analysis.

Table 3 provides descriptive data for the variables of interest in the study, showing the mean, standard deviation, skewness and kurtosis. Descriptive statistics reported a mean self-efficacy score of 31.74 (SD = 2.82). The reported mean score for intrinsic motivation was 53.63 (SD=14.11), with extrinsic motivation reporting a mean score of 57.96 (SD=13.02). The reported mean for GPA was 3.72 (SD = 0.3). Skewness and Kurtosis met normal univariate distribution assumption for reported values which lie within -2 and +2 range (George & Mallery, 2010; Laerd Statistics, 2021). The Shapiro-Wilk test of normality for self-efficacy, intrinsic, and extrinsic motivation appear normally distributed due to $p > .05$.

Table 3

Descriptive Statistics of Continuous Variables of Interest

Variable	Minimum	Maximum	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Self-efficacy	27	40	31.74	2.82	1.06	1.53
Intrinsic	22	84	53.63	14.11	0.39	0.07
Extrinsic	38	84	57.96	13.02	0.48	-0.87
GPA	3	4	3.72	0.3	-0.92	-0.25

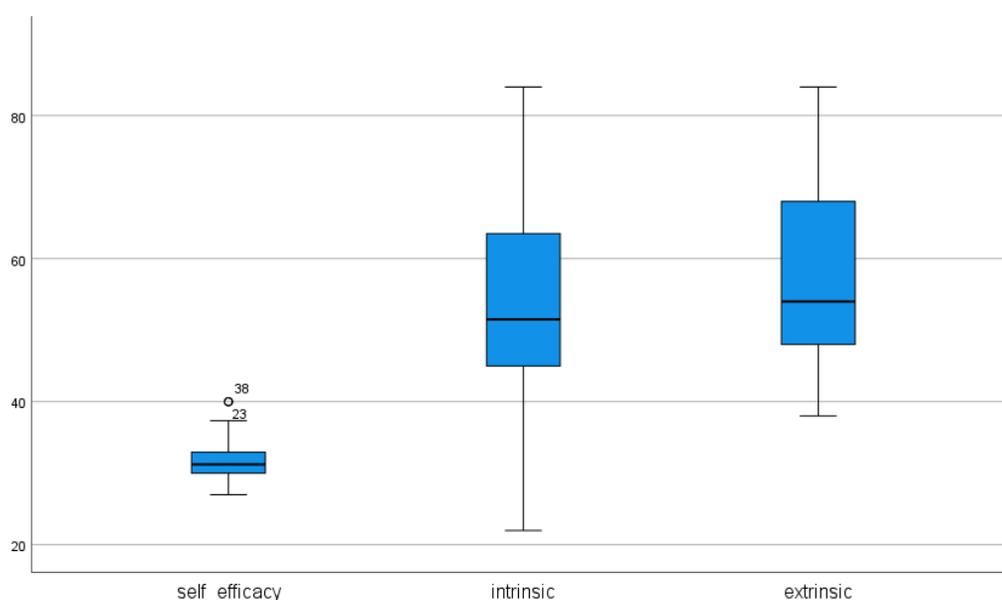
Note. GPA = grade point average.

Concerning outliers Hoaglin and Iglewicz (1986) proved the convention of labeling values above the 3rd quartile or below the 1 quartile by $1.5 * IQR$ was an inadequate measurement of outliers. The recommended $2.2 * IQR$ was used instead (Hoaglin & Iglewicz, 1986). Using this standard there were no outliers identified across

each variable of interest. The self-efficacy box-plot indicates two outliers; however SPSS uses the disproven value $1.5 \times \text{IQR}$ to label each outlier. Thus, there was no need to do a log transformation to make the distribution normal (Laerd Statistics, 2021). No outliers were found in the boxplot analysis for intrinsic and extrinsic motivation (see Figure 4).

Figure 4

Boxplot for Self-Efficacy, Intrinsic Motivation, and Extrinsic Motivation



Inferential Analyses

Pearson Correlation Analysis

Pearson correlation analysis was conducted to assess associations between the study variables: self-efficacy, intrinsic and extrinsic motivation, and academic success. Correlation is useful to assess the strength and direction of the relationship between two variables. A positive value from a statistically significant correlation indicates that as the numeric value of one variable increases the numeric value of the other also increases. A

negative sign indicates the increase of one variable is related to a decrease in the other. Cohen (1992) developed a convention to assess the relative strength of correlation coefficients and identified values 0.1 to 0.30 as small, above 0.30 to 0.50 as medium, and > 0.50 as strong. The analysis showed extrinsic motivation was positively correlated with intrinsic motivation ($r = .54, p < .001$). Correlation coefficients indicated the correlation between GPA, self-efficacy, intrinsic motivation, and extrinsic motivation were weak, which is an indication of statistical non-significance. Correlation of the variables are shown in Table 4.

Table 4

Correlations of Variables of Interest

Variable	1	2	3	4	5
Age	-				
Year enrolled	-0.14				
GPA	-0.001	0.05			
Self-efficacy	0.24	0.11	0.001		
Intrinsic motivation	-0.03	0.02	-0.15	0.16	
Extrinsic motivation	0.03	-0.07	0.54**	0.25	0.54

Note. GPA = grade point average.

** $p < .001$.

Research Question 1

RQ1: To what extent is there an association between self-efficacy, as measured by the General Self-Efficacy Scale, and academic success as measured by self-reported overall GPA, in online learners with ADHD?

H_{01} : Self-efficacy, as measured by the General Self-Efficacy Scale, is not a significant predictor of academic success, as measured by self-reported overall GPA, in online learners with ADHD.

*H*₁₁: Self-efficacy, as measured by the General Self-Efficacy Scale, is a significant predictor of academic success, as measured by self-reported overall GPA, in online learners with ADHD.

Assumption Test. The assumption of linearity was tested using a scatterplot of the predictor and outcome variable. Linearity is indicated if the data points form a linear trend with an approximately random distribution of points (Tabachnick & Fidell, 2018). Analysis of the scatterplot for this research question indicated a general positive linear trend between self-efficacy and GPA. Simple linear regression assumes the relationship between a predictor and the mean of the outcome variable is normally distributed (Tabachnick & Fidell, 2018). Linear normality was assessed by creating a normal Q-Q plot of standardized residuals and examining the distribution of points along the regression line. Linear normality is indicated when the data points are near the line with a general linear pattern (Tabachnick & Fidell, 2018). The normal Q-Q plot for this regression followed a linear trend with minor departure from the line between the 0.4 and 0.8 cumulative probability points and indicates approximate linear normality.

Simple linear regression also assumes the variance of residuals is the same for any value of the outcome variable commonly referred to as homoscedasticity (Tabachnick & Fidell, 2018). Homoscedasticity was assessed by creating a scatterplot of the standardized predicted value (y-axis) with the standardized residual (x-axis). Homoscedasticity is assumed if the distribution of data points evenly distributes above and below the zero line in an approximately random pattern (Tabachnick & Fidell, 2018). The scatterplot

indicated the data points were evenly distributed in a mostly random pattern indicating homoscedasticity.

A simple linear regression was calculated with self-efficacy as the independent variable and GPA as the dependent variable. Table 5 shows the result of the regression analysis. Regression results indicated self-efficacy did not significantly predict GPA, $F(1,50) = .000$, $p > .05$. The null hypothesis was retained, and the alternative hypothesis rejected.

Table 5

GPA Regressed Onto Self Efficacy (N = 52)

	<i>b</i>	<i>SE</i>	beta	Fit
Constant	3.70	0.50		
Self-efficacy	0.001	0.02	0.005	
				$R^2 < 0.001$
				$F(1, 50) =$
				0.001

Note. GPA = grade point average.

Research Question 2

RQ2: To what extent is there an association between academic intrinsic motivation, as measured by the Academic Motivation Scale, and academic success, as measured by self-reported overall GPA, in online learners with ADHD?

H_02 : Academic intrinsic motivation is not a significant predictor of academic success in online learners with ADHD.

H_12 : Academic intrinsic motivation is a significant predictor of academic success in online learners with ADHD.

The assumption of linearity was tested using a scatterplot of the predictor and outcome variable. Analysis of the scatterplot for this research question indicated a general positive linear trend between intrinsic motivation and GPA. Linear normality was assessed by creating a normal Q-Q plot of standardized residuals and examining the distribution of points along the regression line. The normal Q-Q plot for this regression followed a linear trend with minor departure from the line between the 0.3 and 0.7 cumulative probability points and indicates approximate linear normality.

Homoscedasticity was assessed by creating a scatterplot of the standardized predicted value (y-axis) with the standardized residual (x-axis). The scatterplot indicated the data points were even distributed in a mostly random pattern indicating homoscedasticity.

A regression was run with intrinsic motivation as the independent variable and GPA as the dependent variable. Regression result showed intrinsic motivation did not significantly predict GPA ($\beta = -0.12$, $p > 0.05$), $F(1, 50) = 0.000$, $p > 0.05$. The null hypothesis was retained, and the alternative hypothesis rejected, as shown in Table 6.

Table 6

GPA Regressed Onto Intrinsic Motivation (N = 52)

	<i>b</i>	<i>SE</i>	beta	Fit
Constant	3.86	0.17		
Intrinsic Motivation	-0.003	0.03	-0.12	
				$R^2 < 0.02$ $F(1, 50) = 0.77$

Note. GPA = grade point average.

Research Question 3

RQ3: To what extent is there an association between academic extrinsic motivation, as measured by the Academic Motivation Scale, and academic success as measured by self-reported overall GPA, in online learners with ADHD?

*H*₀₃: Academic extrinsic motivation is not a significant predictor of academic success in online learners with ADHD.

*H*₁₃: Academic extrinsic motivation is a significant predictor of academic success in online learners with ADHD.

The assumption of linearity was tested using a scatterplot of the predictor and outcome variable. Analysis of the scatterplot for this indicated a general positive linear trend between extrinsic motivation and GPA. Linear normality was assessed by creating a normal Q-Q plot of standardized residuals and examining the distribution of points along the regression line. The normal Q-Q plot for this regression followed a linear trend with minor departure from the line between the 0.4 and 0.8 cumulative probability points and indicates approximate linear normality. Homoscedasticity was assessed by creating a scatterplot of the standardized predicted value (y-axis) with the standardized residual (x-axis). The scatterplot indicated the data points were even distributed in a mostly random pattern indicating homoscedasticity.

A regression was run with extrinsic motivation as the independent variable and GPA as the dependent variable. Results were not statistically significant, $F(1,50) = .361$, $p > .05$. The regression analysis also indicated only approximately .7% of the variation in

GPA may be explained by extrinsic motivation, as shown in Table 7. The null hypothesis was retained, and the alternative hypothesis was rejected.

Table 7

GPA Regressed Onto Extrinsic Motivation (N = 52)

	<i>b</i>	<i>SE</i>	beta	Fit
Constant	3.83	0.20		
Self-efficacy	-0.002	0.03	-0.08	
				R ² < 0.007 F(1, 50) = 0.36

Note. GPA = grade point average.

Mediation Analysis

Mediation analysis was used to answer RQs 4 and 5. Mediation is a statistical modeling procedure used to identify and explain mechanisms. Simple mediation is the process of testing the influence of a predictor on an outcome variable through a third variable. Mediation processes how the predictor influences the outcome indirectly via the mediator variable. In the early development of mediation techniques Baron and Kenny (1986) proposed a three-step procedure:

1. Regress the dependent variable on the independent variable (c-path).
2. Regress the mediator onto the predictor variable (a-path). If this relationship is not statistically significant then do not continue.
3. Regress the dependent variable onto both the mediator and predictor variables (b-path). If this relationship is not statistically significant then do not continue.

After completing the three steps above a researcher should assess if the mediated or indirect effect significantly reduces the relationship measured in step 1. The Sobel test was typically recommended to test if the indirect effect was statistically significant.

The Baron and Kenny method is currently considered outdated and no longer used or recommended by experts in mediation analysis (Hayes, 2009; MacKinnon & Fairchild, 2009; MacKinnon, Fairchild, & Fritz, 2007; Preacher & Hayes, 2004; Preacher & Leonardelli, 2001; Zhao, Lynch, & Chen, 2010). The procedural issues with the Barron and Kenny method are outside the scope of this study but in summary mediated effects can and do occur in instances where the a-path or b-path is not statistically significant; the new recommendation is to conduct mediation analysis if at least one of the two paths is significant (Hayes, 2009; Zhao, Lynch, & Chen, 2010). In addition, Preacher and Leonardelli (2001) have demonstrated that the Sobel test of the indirect effect is sensitive to alpha inflation and leads to type II error. Therefore, a bootstrapped procedure using Monte Carlo simulation to estimate the 95% confidence interval of the indirect effect is recommended (Hayes, 2018). Using this method, usually between 5000 and 10000 bootstrapped samples are created and the interval is derived from the 2.5th and 97.5th percentile. The interpretation of the interval is a 95% confidence that the true size of the indirect effect is within the interval. If the interval includes zero, then the true size of the effect could be non-existent. Therefore, an interval that includes zero is not statistically significant.

The mediation used in this sample used the superior method developed originally by Preacher and Hayes (2004) instead of the Baron and Kenny (1986) procedure. The

two procedures are almost identical except Preacher and Hayes (2004) only require that either the a or b path is statistically significant. A 95% CI was calculated for each indirect effect using 10000 bootstrapped samples.

Research Question 4

RQ4: To what extent does self-efficacy mediate the association between academic intrinsic motivation and academic success, as measured by self-reported overall GPA, in online learners with ADHD?

H₀4: Self-efficacy does not mediate the relationship between academic intrinsic motivation and academic success in online learners with ADHD

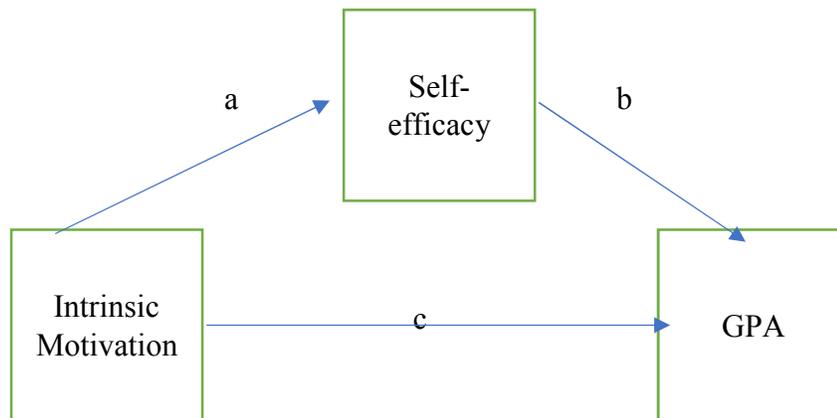
H₁4: Self-efficacy does mediate the relationship between academic intrinsic motivation and academic success in online learners with ADHD.

A mediation analysis was conducted according to current procedures (Hayes, 2018). All mediation was calculated using Process V3.5 (Preacher & Hayes, 2004; Hayes, 2018). Figure 5 demonstrates the mediation model with intrinsic motivation predicting GPA mediated through self-efficacy. The a-path, intrinsic motivation predicting self-efficacy is statistically significant ($b=.28$, $p=.044$), $R^2=.08$, $F(1, 50)=4.28$, $p=.04$. In the b-path, the dependent variable is GPA and independent variables are self-efficacy and intrinsic motivation. After controlling for intrinsic motivation, self-efficacy is not a predictor of GPA ($b=.04$, $p=.77$), $R^2=.02$, $F(2, 49)=.41$, $p=.67$. The c-path or direct effect of intrinsic motivation predicting GPA is not statistically significant ($b=-.12$, $p=.39$), $R^2=.01$, $F(1, 50)=.77$, $p=.39$. The bootstrapped 95%CI of the indirect effect ($a*b$)

was 95% CI[-0.09, 0.13]. The interval contains zero which indicates self-efficacy does not mediate the relationship between intrinsic motivation and GPA.

Figure 5

Self-efficacy, Intrinsic motivation, and GPA



Note. GPA = grade point average.

RQ5: To what extent does self-efficacy mediate the relationship between academic extrinsic motivation and academic success, as measured by self-reported overall GPA, in online learners with ADHD?

H₀₅: Self-efficacy does not mediate the relationship between academic extrinsic motivation and academic success in online learners with ADHD.

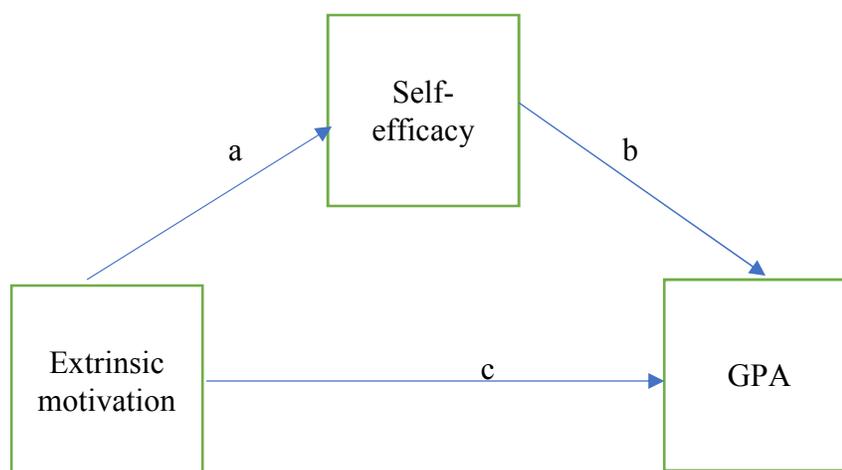
H₁₅: Self-efficacy does mediate the relationship between academic extrinsic motivation and academic success in online learners with ADHD.

Mediation analysis was performed to determine whether self-efficacy mediated the relationship between extrinsic motivation and GPA, shown in Figure 6. The a-path, extrinsic motivation predicting self-efficacy was not statistically significant ($R^2=0.07$,

$F(1, 48)=3.54, p=0.07$). The b-path, self-efficacy predicting GPA after controlling for extrinsic motivation was also not statistically significant ($R^2=0.01, F(1, 47)=0.27, p=0.77$). Both the a and b-path were not statistically significant therefore the mediation analysis was terminated. To summarize, mediation analysis indicated self-efficacy did not significantly mediate the relationship between extrinsic motivation and academic success. The null hypothesis was retained, and the alternative hypothesis rejected.

Figure 6

Self-efficacy, Extrinsic Motivation, and GPA



Note. GPA = grade point average.

Summary

Chapter 4 provided a comprehensive analysis of the results of the study. There were a total of three RQs to predict the significance of the presence of an association between the variables self-efficacy, motivation (IM and EM), and academic success, using regression analysis. RQs 4 and 5 examined whether self-efficacy played a mediating role between motivation (IM and EM) and academic success, using mediation

analysis, based on the work of Preacher and Hayes (2004). The findings for research question one indicated non-statistical significance which led to the null hypothesis being retained. Findings were also similar for RQs 2 and 3, where the null hypotheses were retained due to non-significant findings. The results of the mediation analysis were interesting. In the a-path for RQ4, results show intrinsic motivation predicting self-efficacy was statistically significant. However, extrinsic motivation did not show statistical significance for predicting self-efficacy. In fact, self-efficacy did not significantly mediate the association between extrinsic motivation and academic success for learners with ADHD in online universities.

Chapter 5 will focus on a discussion of the findings. The discussion will include an interpretation of findings in the context of the literature reviewed in this study, limitations of the study including generalizability, and implications for social change. Findings will be interpreted from what the research study outcomes indicated. Chapter 5 will also have recommendations for future research directions based on the current findings and from what is already known in the literature.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this research study was twofold. First, I wanted to explore whether an association could be determined between self-efficacy, motivation (IM and EM), and academic success of learners with ADHD in online universities. Second, I wanted to examine the process through which these variables may be linked-specifically, whether self-efficacy mediated the relationship between motivation (IM and EM) and academic success. Extant research, including that of Farmer et al. (2015) and Usher et al. (2019) looked at the study variables within a traditional university setting (i.e., brick and mortar). However, these research studies have not established whether there is an association between self-efficacy, motivation (IM and EM), and academic success within an online university setting. Confirming the presence of an association may help university leaders identify and implement support systems to increase overall learner retention and corresponding academic success. Concerns are documented in the literature regarding the struggle learners with ADHD have in achieving academic success (Kwon et al., 2018). With even more learners choosing online universities as a viable option, this research may extend the conversation on equitable systems that need to be in place to increase retention and success rates for all learners, including those with an ADHD diagnosis (Hwang et al., 2018; Zeeuw et al., 2017).

The sample for this study was comprised of self-selected participants who appeared to have learned how to be successful in online universities, a factor which reduced the variability of data and subsequent analysis findings; these participants all

reported high GPA scores. High GPA scores suggested that study participants were high-functioning learners with an ADHD diagnosis. Given the fact there was little variability in the reported GPA scores, finding one or more predictors for any variability proved difficult, which impacted the RQs and may have biased the study's findings. Findings from the regression analyses showed statistical nonsignificance in the association between the variables self-efficacy, motivation (IM and EM) and academic success. The measures used to conduct data analyses were the GSES scale, the AMS scale, and GPA scores.

The findings showed the descriptive statistics for demographic variables (see Table 1), descriptive statistics for the variables of interest (see Table 3), and correlations of the variables of interest (see Table 4). Regression analysis for RQ1 showed that self-efficacy did not significantly predict academic success for online learners with ADHD (see Table 5). For RQ2, regression result showed intrinsic motivation did not significantly predict academic success for online learners with ADHD (see Table 6). Last, for RQ3, regression showed extrinsic motivation was not a significant predictor of academic success for online learners with ADHD (see Table 7). The results of the mediation analyses, which were conducted using current procedures developed by Preacher and Hayes (2004), indicated that self-efficacy did not mediate the relationship between motivation (IM and EM) and academic success. However, the *a*- path in the mediation analysis using intrinsic motivation to predict self-efficacy was statistically significant (see Figure 3). There was no statistically significant findings in correlation between self-efficacy, motivation (IM and EM) and academic success. However,

correlation analysis showed a positive correlation between intrinsic and extrinsic motivation, which confirmed similar findings by Vallerand et al. (1992).

To summarize, the main findings from data analysis conducted in Chapter 4 showed no statistically significant associations between self-efficacy, motivation (IM and EM), and academic success for learners with ADHD in online universities. In addition, the presence of a mediation effect (self-efficacy as mediator variable) could not be established. I performed linear regression analysis for three RQs and mediation analysis for two RQs. For all the RQs, the null hypotheses were accepted, and the alternative hypotheses were rejected.

Ongoing discussion in this chapter will focus on the interpretation of study findings in relation to the literature reviewed in this study. A discussion of the theory self-efficacy pioneered by Bandura (1986) which guided this research study is provided. In addition, a discussion of the research limitations, implications for improving effective social change, and recommendations for future research is presented.

Interpretation of the Findings

In this section, I will discuss the results of data analysis for each RQ, as presented in Chapter 4. The first RQ concerned the association between self-efficacy and academic success. The second RQ examined the association between academic intrinsic motivation and academic success. The third RQ examined the association between academic extrinsic motivation and academic success. The fourth RQ examined whether self-efficacy mediated the relationship between academic intrinsic motivation and academic success. Lastly, the fifth RQ examined whether self-efficacy mediated the relationship

between academic extrinsic motivation and academic success. The null hypothesis was retained in RQs 1-3 due to insufficient findings to predict an association between self-efficacy, motivation (IM and EM), and academic success. Similarly, study findings could not establish the presence of self-efficacy having a mediating effect on the relationship between motivation (IM and EM) and academic success.

Findings were based on a sample size of 52 participants who attended an online university and were at least 18 years old, with a self-reported diagnosis of ADHD. Using the theoretical framework of self-efficacy developed by Bandura (1986), I will discuss the association between self-efficacy and academic success. Findings on associations between motivation (IM and EM) and academic success, based on the work of Deci and Ryan (1985), will also be discussed. Finally, findings on the mediating role of self-efficacy between motivation (IM and EM) and academic success will be discussed.

Self-Efficacy and Academic Success

Academic success describes a learner's successful accomplishment of their academic goals based on course objectives and/or program expectations (York et al., 2015). Since previous studies suggest that self-efficacy is a major factor to predict academic success, it was important to find out if this assumption held true for learners with ADHD in online universities as this learner population is known to struggle with executive functioning, which interferes with academic success (Huang-Pollock & Karalunas, 2010; Jarratt, 2015). Findings from the data analysis for RQ1 showed that an association between self-efficacy and academic success was not statistically significant at $p > .05$, which indicates that self-efficacy, as a stand-alone variable, was not a predictor

of academic success for study participants. This result points to other potential factors discussed in the literature review that may be impacting academic success of learners with an ADHD diagnosis. The study participants were all high-functioning learners with ADHD, as indicated by their high GPA scores (see Table 1), which suggest that they had high self-efficacy and motivation (IM and EM) to achieve academic success. Having a self-selected population of individuals who learned to be successful in online universities may have biased the study's findings. However, not all learners with ADHD are high functioning; therefore, a review of other factors that support academic achievement is worth discussing.

These factors may include instructor engagement practices, environmental support systems, and promotion potentials from degree acquisition. An in-depth investigation of these factors is beyond the scope of this study; however, a brief analysis is provided which is supported by the literature review. Studies support the idea that positive instructor engagement influences academic persistence and success (Budash & Shaw, 2017; Farmer et al., 2015). These research studies suggest that low instructor engagement may negatively influence learners' level of engagement, which leads to academic failure. What is apparent from the research is that learners with ADHD in online universities would benefit more with closer mentorship from their instructors, which leads to their academic success. Therefore, it could be argued that instructors who provide clear guidance in course work, use multiple approaches to deliver course content, and provide formative feedback at all phases of the course, will increase engagement and persistence in learners, including those with ADHD. Instructors represent their

universities; learners with ADHD who do not model high self-efficacy and motivation (IM and EM) and who do not feel supported by their instructors may decide to terminate their degree prematurely. When this happens, online universities may experience high attrition rates.

Environmental support systems could also play a contributing role in the academic success for learners with ADHD in online universities. Current research suggests learners who feel a sense of connectedness to their university are more likely to achieve academic success (Rovai, 2002; Salvo & Welch, 2019). Learners with ADHD who feel supported by their family tend to persist in their learning, score high on their GPA as demonstrated in this research (see Table 1), and finish their degree (Hill & Wang, 2014). This assumption is supported in the research literature which recognized the importance of environmental support systems such as family and peer supports to engender learners' academic success. For those learners with ADHD who need more support to persist in their learning, a strong environmental support system appears to be critical to their academic success. As confirmed in the research literature, a strong family and peer network increases academic success for learners with ADHD in online universities (Brown, 2017).

A third and final factor noted here which may account for academic success of learners with ADHD in online universities is the *incentive of job promotion*. Research confirms that an earned degree increases earning potential (US Census Bureau, 2010; Wright, Jenkins-Guarnieri, & Murdock, 2012). As is true for all learners, those with an ADHD diagnosis may also persist in their learning when there are external rewards tied

to academic success, for example earning a higher income or getting a promotion.

Perhaps if instructional design embed timely reminders of external rewards linked to academic success, these reminders may encourage learners with ADHD to persist and achieve academic success.

The sample population in this study reported a high GPA which may indicate high levels of self-efficacy and motivation (IM or EM) to achieve academic success. This positive disposition may be fueled in part by frequent encouragement from family, friends, and instructors which help learners to achieve their academic goal. Based on what current research tells us about the influence of engagement practices, environmental supports, and external rewards on academic success for online learners with ADHD, online universities should consider embedding these resources in their program as one way to increase retention rate for this sub population of students. In summary, the nonsignificant results of RQ1 and the current literature suggest other factors than self-efficacy, including potentially environmental supports, incentive of job promotion, and instructor engagement, may contribute to learners' academic success.

Intrinsic Motivation and Academic Success

Motivation is viewed as a major factor in learner persistence in self-regulated learning environments, such as online universities (Kizilcec et al., 2017; Serin, 2018). It therefore made sense to examine whether intrinsic motivation (IM), which refers to learning behaviors inspired by inner desires, had an association with academic success for learners with ADHD in online universities. Research has established there is an association between intrinsic academic motivation and academic success. However, in

this research study, regression result for RQ2 showed a non-statistical significance of an association between academic intrinsic motivation and academic success.

What is known about intrinsic motivation is that learners who have a vested interest in their learning tend to persist in the face of challenges. Indeed, the sample population's reported mean for intrinsic motivation was high which suggested that learners with ADHD who exhibit a high desire to learn will be successful in their pursuit of learning. One reason the analysis did not find a significant association between intrinsic motivation and academic success is that my study did not have enough participants to predict a significant result. Many studies cited in the research literature used several hundred participants in their research to predict a significant finding (Farmer et al., 2015; Fleming & Wated, 2016; Fuller-Thomson et al., 2016; Hwang et al., 2018). Despite the drawback with the study's sample size, the analysis speaks to an important aspect of intrinsic motivation with regards to academic success. Engaging instructional designers in conversations to gain an understanding of how intrinsically motivated learners engage and stay persistent in the face of academic challenges, may help them in the development of courses which convey meaning, relevance, and personal development. Creating opportunities for learners with ADHD in online universities to feel empowered in their learning through the instructional design process may serve as a bridge to increasing intrinsic motivation and academic success.

Extrinsic Motivation and Academic Success

Extrinsic motivation (EM) characterizes learners who adopt an external locus of control in their academic pursuits. An example of this type of motivation is performance

tied to some external reward system (Deci & Ryan, 1991). It was important, therefore, to examine the association between EM and academic success of learners with ADHD in online universities. The results of these analyses were insignificant. The data findings suggest there was no statistically significant association between EM and academic success. It would appear from the research findings that EM- in and of itself- is not a significant predictor of academic success. Again, as a reminder, the study's small sample size may have been a factor in non-significant findings. However, the findings do point to a broader picture of other reasons learners with ADHD in online universities may or may not achieve academic success. Consistent with previous arguments, I will continue to briefly discuss other factors which might be contributing to the issue of academic success for learners with ADHD in online universities

In the previous section, other factors were discussed which contributed to academic success. In this section, two other factors- increase in income and recognition for achievement-which also contribute to academic success (Brown, 2017; US Census Bureau, 2010; Wright, Jenkins-Guarnieri, & Murdock, 2012) will be discussed through the lens of extrinsic motivation. Extrinsic motivation is synonymous with obtaining external rewards based on effort. From this perspective, online learners with ADHD may be motivated to persist in their learning when there are meaningful rewards tied to their accomplishment. It might be worth the consideration for online universities to offer a comprehensive and tangible reward system in a staggered way to foster engagement and persistence characteristics which would increase academic success for all learners, including those with ADHD. An example to consider might be to offer online learners a

discount on tuition fees or a discount/upgrade on hotel accommodations at residency events, based on their performance over several semesters.

An analysis of the research literature in chapter 2 suggest learners who are extrinsically motivated are performance driven. Learners who are performance driven do not place emphasis on engaging in the actual coursework which is fundamental to academic success; rather, the emphasis of externally focused learners is on the anticipated reward for having accomplished the goal, for example earning a high GPA. It should be considered that not all learners with ADHD are performance driven, requiring extra support from university administrators and instructors to achieve academic success. An early identification of those learners, perhaps through a university-wide survey may help to identify and provide access to services to those learners with ADHD who need extra support to persist in their self-regulated learning. In this research study, the sample reported high GPAs which suggest these learners were highly extrinsically motivated to succeed in their studies. While the results of this study may not hold true for all learners within this sub population, they point to the idea that learners with ADHD in online universities can achieve academic success if they are nurtured throughout their program of study.

Online university administrators could collaborate with instructional designers and faculty in conversations around identifying and embedding rewards throughout each course to increase learner engagement and persistence which would also benefit those with ADHD. Understanding the critical role instructors play in supporting engagement and persistence throughout the learners' program of study, emphasis should be placed on

providing ongoing professional development in best practices on engagement approaches to instructors in online universities. By so doing, new and veteran instructors in online universities may increase their engagement skills to support academic success for learners with ADHD.

A recommendation for faculty's input in the academic success of their learners is provided here. Faculty in online universities have the power to help their learners model high self-efficacy, motivation (IM and EM), and achieve academic success. From an instructional standpoint, the research literature indicates that self-regulated learners have a greater chance of being successful in online universities (Kizilcec et al., 2017). Faculty within online universities could help all learners, including those with an ADHD diagnosis, increase their academic success by incorporating effective teaching strategies in their instructional delivery. These strategies include clarification of course goals and objectives, group learning expectations, utilizing interactive media in course delivery, and providing summative feedback to guide the learning process. To summarize, faculty within online universities may help learners grow, develop, and achieve academic success by utilizing best practices discussed in the literature, including the following: embed interactive media in group discussions and group work, provide goal-relevant assignments, give small group assignments to encourage peer mentorship, provide high frequency and comprehensive instructor feedback, and referencing the course rubric to communicate expectations for assignments due. Positive feedback increases intrinsic motivation

To reiterate, the study's sample consisted of 52 participants who reported high GPA scores. The high GPA scores suggest learners with ADHD in online universities can and do achieve academic success. The findings also showed learners with ADHD having the ability to excel when they engage in learning they find enjoyable, relatable, and rewarding. This translates into high GPAs and consequently academic success. There are learners with ADHD, however, who do not have this success story, based on what is known from the literature review. What is known is that there are learners with ADHD who struggle with executive function characteristics which impacts self-regulated learning, time management, and organizational skills; these skills appear to be characteristic of learners who achieve academic success, including those with ADHD (Kaufman, 2015; Walter & Hoops, 2015). In addition, those learners who do not feel they are connected to their learning community may find it challenging to stay focused on their academic goals. Keeping in mind that learners who are extrinsically motivated thrive on external affirmation and rewards, instructors should consider including positive praise in their feedback within the group setting and in individualized course work consistently. Furthermore, data obtained from Walden University indicated only one half (1/2) of one percent (1%) of learners self-identify as having an ADHD diagnosis with disability services. The data also indicated that some participants who had an ADHD diagnosis do not self-report this to their disability services. When learners do not self-identify as having an ADHD diagnosis, they are not able to take advantage of accommodations available to them which may increase their propensity to achieve academic success.

In summary, regression analysis in this study indicated extrinsic motivation (EM) was not a significant predictor of academic success. Conversations around identifying strategies to increase academic success for extrinsically motivated learners with ADHD who struggle in their coursework could help to increase their persistence and graduation rate. One strategy might be to allow flexibility in course design for learners to choose how an assignment may be completed which would empower, motivate, and increase self-efficacy of online learners with ADHD.

Self-Efficacy as a Mediator Variable

This study also tested the mediation effect self-efficacy would have on the relationship between motivation (IM and EM) and academic success. Mediation analysis is used to identify and explain the mechanism surrounding how variables interact. In brief, simple mediation analysis was used to determine whether intrinsic and extrinsic motivation could predict GPA, when mediated by self-efficacy. All mediation analyses were conducted using current mediation procedures developed by Preacher and Hayes (2004). For RQ4, the *a*-path showed statistical significance in intrinsic motivation predicting self-efficacy; however, the *b*-path was not significant. At a 95% CI, the mediation analysis for RQ4 showed that self-efficacy did not mediate the relationship between intrinsic motivation and GPA.

Continuing with mediation analysis for RQ5, data findings showed that both the *a*-path and *b*-path were not statistically significant for predicting academic success, with extrinsic motivation as the predictor variable of academic success and self-efficacy as the

mediator variable. Therefore, further analysis was terminated. In both cases, the null hypotheses were accepted, and the alternative hypotheses rejected.

In summary, the two mediation models tested whether the association between intrinsic motivation and GPA, and the association between extrinsic motivation and GPA, could be mediated by self-efficacy. The simple mediation analysis did not provide any evidence of an effect of intrinsic or extrinsic motivation on GPA, when mediated by self-efficacy. However, the mediation analyses found a positive association between intrinsic motivation and self-efficacy, which is consistent with previous research studies (Coetzee, 2014; Ergun & Avci, 2018).

Summary of Self-Efficacy Results

To summarize this section, the regression analyses suggest there were no significant association between self-efficacy, motivation (IM and EM), and academic success. These findings contradict previous work that has found an association between motivation (IM and EM), and academic success (Deci & Ryan 1985), and self-efficacy and academic success (Bandura, 1986). However, the research literature does not provide information on the strength of those relationships. In examining the association between the variables via correlation analysis (see Table 4), this current study found that the association between self-efficacy, IM, EM, and academic success were nonsignificant, except for a significant correlation between GPA and EM.

An important aspect of this study was to predict the mediating role of self-efficacy between IM and EM on academic success for learners in online universities. When mediation analysis was performed, outcomes showed that self-efficacy did not

show a statistically significant association in mediating the relationship between IM and academic success, and between EM and academic success.

It is possible that convenience sampling, in addition to the low sample size might have influenced the nonsignificant data findings. In behavioral research, effect size is used to explain the magnitude in the variation noted between two or more variables. Due to the final sample size ($N = 52$) used in my study, it was difficult to observe any variation between variables and to observe any statistical significance. Furthermore, using convenience sampling influenced data findings as the study utilized self-selected participants based on their availability and willingness to participate in the study. From reported GPA scores, these participants appeared to have the skills to be successful in online universities. Notwithstanding, consideration needs to be given to other factors that support academic success. Online universities should consider the following recommendations to enhance current practices to increase academic success for learners with ADHD and increase retention rates. Strategies to increase learner engagement via learning communities in online universities, providing access to online resource materials to enhance learning and study habits, and convening cohort residencies as part of degree requirements all could potentially play a role in supporting the academic success of learners with ADHD in online universities.

Findings in Relation to the Theoretical Framework

The theoretical framework underpinning this research study was self-efficacy theory, developed by Bandura (1977). Self-efficacy was an appropriate theory to guide this research in examining academic success for learners with ADHD in online

universities because in self-regulated learning environments, learners need to have high confidence in their abilities to stay focused, committed, and persistent (Ergun & Avci, 2017; Usher et al., 2019). Moreover, prior research examined the role of self-efficacy and motivation (IM and EM) in predicting academic success. It made sense therefore to also examine the strength of the relationship between these variables regarding their impact on academic success of learners in online universities, focusing on ADHD learners in the sample.

Research findings extend current knowledge on the association between self-efficacy, motivation (IM and EM), and academic success. Study findings showed a significant correlation between intrinsic and extrinsic motivation, which aligns with previously published research (Deci & Ryan, 1985; Park & Yun, 2017). Nonsignificant correlations were found between all other study variables. What was interesting though, was that IM and EM- independently- did not predict GPA.

Previous studies cited in the review literature have shown an association between self-efficacy, motivation (IM and EM), and academic success. This study did not find this association between the variables, which was disappointing. As mentioned earlier, the non-significant findings could be a factor of the small sample size and highly motivated participants, evidenced in their high GPA score. The high academic performance by the study's sample was a departure from what Farmer et al. (2015) found in their research study. However, the fact that the study reported high performance from this group of learners is promising to online universities who seek to increase the ratio of degree completion.

There is agreement in the research literature that self-efficacy is a factor in academic success which is also evident in the work of Bandura (1986). However, since we do know that academic success is a product of many factors, of which self-efficacy is one, thoughtful consideration should be equally given to other factors mentioned in this study which contribute to academic success for learners with ADHD in online universities. Paying attention to those factors, including financial and technology challenges, and cultural approaches to learning may uncover ways to rescue this population of learners from disenchantments and attrition. Supported by the work of Brown (2017) and Hope (2015), the argument here to place equal scrutiny on “other factors” is honoring to the work of Bandura (1986) which provides context for exploring how learners in online universities, including those with ADHD, can achieve academic success.

Limitations of the Study

A quantitative regression analysis methodology with a non-experimental design was used in this study. This research design allowed for data to be collected over a specific time frame. Convenience sample was used to recruit participants to complete the electronic questionnaire administered via Survey Monkey. To give a response which was more appealing, participants may have reported a higher GPA score which would impact the analysis and findings. Therefore, caution should be exercised in using study findings. Individual understanding and interpretation of the scales from a cultural viewpoint may also have biased participant responses. For example, participants would interpret survey

questions through their unique cultural lens, which would have different interpretations accordingly.

Findings were limited to the sample population in online universities, which also limits the generalizability to other populations of learners. To reduce limitations and offset biased responses, effort was made to utilize measures in the data analysis which had strong reliability and validity. The sample size of 52 participants used in the study is considered small, which created a limitation in the study's power to find effects. However, using a sample consisting of online university learners with ADHD provided insights into those factors which influence academic success for learners with ADHD in online universities. Other limitations may include age, ethnicity, and culture of participants. In the study's sample, the mean age of participants was 37 years with the majority reporting as Caucasian. What is known in the literature is that differences in age, ethnicity, and culture impact the way in which learners engage, are stimulated during learning, and acquire knowledge (Matsumoto, 2001; Stavredes, 2011). This is an important consideration for discussions around instructional design and course delivery to increase academic success for learners with ADHD in online universities.

Recommendations

Based on study findings, several recommendations for future study are provided. To briefly summarize, study findings indicated regression analyses and mediation analyses linking the variables of interest in this study were not significant. In other words, the association between the variables was not enough to explain academic success of learners with ADHD in online universities. Non-significant findings in the association

between self-efficacy, motivation, and academic success did not provide an explanation for high attrition experienced by online universities or challenges with academic success by learners with ADHD who attend online universities.

Further research is needed to explain challenges with achieving academic success for learners with ADHD in online universities. This research found no statistical significance in the association between self-efficacy, motivation (IM and EM), and academic success. In addition, sample participants reported high GPA scores which was unexpected but interesting, as it points to a glimmer of hope to rescue those learners with ADHD who are not achieving academic success. Perhaps future research can explore whether an association between self-efficacy and using a strength-based intervention measure could be established, to provide insight into challenges to achieve academic success. A strength-based intervention measure would focus on the strengths learners have and what other skillsets would need to be developed to achieve academic success. A look at demographics findings showed that more women than men participated in the study. Further research could explore study variables to notice whether associations differed for men and women. Such research could extend current literature to inform how the associations of these variables may differ as a function of gender. This recommendation could extend the current understanding of how learning is approached from a gender perspective. Research shows males and females have different learning styles which impact self-efficacy (Stavredes, 2011). Moreover, research indicates that gender roles could impact attitudes regarding self-efficacy which may influence how learners view their academic success (Stavredes, 2011; Ambrose et al., 2010). Therefore,

learning styles may reflect gender norms in the learning transaction in online universities for learners with ADHD. Knowledge regarding gender approaches to learning could help in the development of instruction to empower gender groups to persist in their learning.

Another recommendation for future research is to conduct an analysis of these variables and explore whether age would moderate the associations; this approach would assess whether the association would vary as a function of age. Such an analysis may uncover new insight into how self-efficacy functions in helping learners with ADHD in online universities achieve academic success. Research shows that as learners age, they develop in their intelligence (Merriam & Caffarella, 1999) which is more than just learning to pass exams. In addition, age impacts learners' long term and short term memory—that is their ability to exhibit good recall (Baddeley, 2007). Therefore, by testing age as a moderating variable, insights on the acquisition and application of new schemas may be better understood, thus giving insight into learners' self-efficacy practices, internal and external motivating influences, which impact their persistence and academic success.

The study was conducted without considering participants' level of self-efficacy and motivation (IM and EM). In other words, participants were not required to report a certain level of self-efficacy or motivation (IM and EM) to be included in the study. Self-efficacy and motivation (IM and EM) are based in socio-cultural experiences and thus not easily quantifiable (Matsumoto, 2001) even though they are reliable and valid variables as evidenced in other research studies (Bandura, 1986; Deci & Ryan, 1985). In fact, in their study on self-efficacy and persistence, Usher et al. (2019) found that variables

which were not easily quantifiable and measurable were not comprehensive enough to explain learners' self-efficacy worth. The authors suggested that "other social cognitive factors" (p. 891) should be considered in making predictions around self-efficacy and academic success. A recommended course of action to this dilemma may be to conduct qualitative research centered on learners with ADHD in online universities sharing their perception of their motivation and self-efficacy level to capture their thoughts regarding their learning, and how their thoughts might influence their behaviors to achieve academic success.

A final recommendation for future research is for a qualitative study design to explore the lived experiences of learners with ADHD who study in online universities. Such findings would deepen the literature as participants could share their personal experiences with learning in an online environment which extends the narrative from a worldview perspective (Wincup, 2017). Insights gained from a qualitative research study with this focus may broaden our understanding of how learners with ADHD in online universities perceive their self-efficacy in their pursuit of academic success.

Implications of the Study

Positive Social Change

My research study focused on filling a gap in the literature by focusing on exploring the association between self-efficacy, motivation (IM and EM), and academic success of learners with ADHD in online universities. Additionally, my research explored the mediating effect of self-efficacy on the relationship between motivation (IM and EM) on academic success. While the results of this study did not show significant links

between the variables, the extensive literature review conducted for this project resulted in meaningful insights that may impact decision making at various levels within online universities to support learners' academic success.

Specifically, learners in online universities may benefit from multiple levels of support to attain academic success, which is a concern documented by Britt (2014) which relates to high attrition experienced in online universities. In summary, online universities should take a comprehensive approach in understanding the multiple factors which impact learners' pursuit of academic success in a rigorous self-regulated learning environment, an approach which would also benefit those with ADHD and may struggle with academic success.

Practice

Instructors, instructional designers, and administrators in online universities could benefit from insights obtained from this research study. Instructors for example, may adopt recommended strategies suggested in this research study to inform their engagement practices with learners in group and individual settings to foster learner persistent practices. Instructional designers may also glean insights into the way in which learners develop schemas and apply knowledge and use this insight to guide the development of course work which supports engagement and persistence. Finally, online university administrators may use results from this study to inform professional development of faculty to aid in supporting learners' academic success. Having a comprehensive understanding of how self-efficacy, motivation (IM and EM), academic

success, and life factors impact learners' persistence, will guide the development of strategic plans at all levels to increase retention rates and academic success.

Conclusion

The study involved an investigation of the association between self-efficacy, motivation (IM and EM), and academic success. This study performed three regression analyses and two mediation analysis to address each of the five research questions. Significant correlation was found between GPA and EM. No other significant findings emerged from these analyses. A high mean GPA was reported for study's participants which suggest they were high functioning learners with ADHD. The study discussed other factors which impact academic success for learners with ADHD in online universities who are not high functioning. These factors, not easily quantifiable, can contribute to academic success of learners with ADHD in online universities. Limitations, sampling methodology, and research design, also discussed, may impact study findings and generalizableness.

Suggestions for future research included conducting qualitative research to gain insight into the lived experiences of learners with ADHD who attend online universities. Implications for social change at the policy, administrative, and instructional level were presented. This study extends prior research on self-efficacy, motivation (IM and EM) and academic success to improve the quality of the academic experience of learners in online universities and provided examples of approaches online universities may adopt to increase the persistent nature of learners with ADHD to achieve academic success.

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Appendix A: Invitation to Participate

Hi,

My name is *Kareta Lewin*, a doctoral candidate from Walden University. My discipline is Psychology, with a teaching specialization. The focus of my dissertation is examining how self-efficacy and motivation impact the academic success of adult learners with ADHD who attend online universities. Volunteers who are 18 years or older with an ADHD diagnosis or think they have this diagnosis are welcomed to participate in this study to assist me with completing my doctoral requirements. This survey will be administered anonymously via survey monkey which will take approximately 30 minutes to complete. Participation is completely voluntary, and information collected will be stored in a secure and confidential database.

The goal of my study is to gain a deeper understanding of those factors that challenge adult learners who attend online universities. The results for this study could contribute to the ways in which administrators, instructional staff, and students corroborate in future forums to define ways to improve learning in online universities which support student retention, instructional goals, and student success. Once you open the survey you will be provided with a consent form to complete prior to answering survey questions.

Thank you for your valuable input.

Sincerely,

Kareta Lewin,

Psychology Doctoral Candidate.

Appendix B: Survey Questions

Demographic Questionnaire

1. Please state your age:

2. Please state your gender:

a. _____ Male

b. _____ Female

c. _____ Other

3. Please check your ethnicity/race:

a. _____ African American/Black

b. _____ Caucasian/European

c. _____ Hispanic/Latino

d. _____ Native American/American Indian

e. _____ Asian/Pacific Islander

f. _____ Other

4. What degree are you currently pursuing?

a. _____ bachelor's

b. _____ master's

5. Please report your date of enrollment in your current program.

6. Please report your current GPA from your last

semester/Quarter _____

7. Is your GPA calculated on a 4.0 scale

_____ YES

_____ NO

_____ Not sure

8. At any point in your life, have you received an official ADHD diagnosis from a medical doctor?

a. _____ YES

b. _____ NO

9. Are you taking a stimulant now?
