PAWS-ITIVITY: ANIMAL-ASSISTED INTERVENTIONS, ONE PAW AT A TIME:

A META-SYTHENSIS OF THE CURRENT LITERATURE ON ANIMAL-ASSISTED

INTERVENTIONS IN THE ELEMENTARY CLASSROOM

by

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Abstract

Animal-Assisted Interventions (AAI) are becoming increasingly more popular in various fields including education. AAI has been incorporated into numerous reading programs across Canada and the United States where studies have found AAI to have a positive impact on reading ability as a result of an animal's ability to remain neutral and nonjudgmental. Other studies involving AAI have found benefits on student emotion, behaviour, and motivation. Throughout the literature there is evidence that supports the use of AAI to increase concentration, motivation, engagement, mood, and academic performance. AAI has also been shown to decrease anxiety, depression, aggression, avoidance, and stress. Knowing the benefits that AAI has on student academics, wellbeing and behaviour, the research presented in this study sought to determine the benefits AAI has on the optimal learning environment. The optimal learning environment is one where barriers are removed for students to feel safe, accepted, connected and ready to learn. Guided by qualitative meta-synthesis research design, two data sets from research on the optimal learning environment and AAI were gather, organized, and analyzed. The results generated a resource for teachers to refer to prior to incorporating AAI into the classroom while providing recommendations for future research.

Keywords: Animal-Assisted Intervention (AAI), Animal-Assisted Education (AAE), Animal-Assisted Therapy (AAT), Animal-Assisted Activities (AAA), Optimal Learning Environment

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CHAPTER ONE: INTRODUCTION

Introduction

Humans seek belonging and relationships and when asked who man's best friend is, the most likely answer was dogs. Dr. Boris Levinson once said,

A pet is an island of sanity in what appears to be an insane world. Friendship retains its traditional values and securities in one's relationship with one's pet. Whether a dog, cat, bird, fish, turtle, or what have you, one can rely upon the fact that one's pet will always remain a faithful, intimate, non-competitive friend – regardless of the good or ill fortune life brings us" (Zilcha-Mano et al., 2011, p. 346).

Animals have had a crucial role in human history. For centuries the Greek, Egyptian, and Romans used animals for their protection, and companionship (Boe, 2008, p. 25). Animals have been a source of food, a mode of transportation, materials for clothing and shelter, tools for farming and building, and a source of companionship. Serpell (2010) refers to this complex history as a complicated relationship (p. 3). During the Age of Enlightenment animals served as social companions for both children and the mentally ill (Serpell, 2010, p. 28). In the 18th century, Florence Nightingale an English nurse, documented how small animals reduced anxiety in institutionalized children (Barnhart et al., 2020, p. 2). In the 1930s, Freud observed how his chow Jofi, eased bonding with clients (Bachi & Parish-Plass, 2017, p. 3). It is documented that in the 1940s a war veteran brought his Yorkshire Terrier to hospitals for brighten the spirits of wounded soldiers (Joseph, Thomas & Thomas, 2016, p. 53). Similarly, the US Army has used farm animals as a way to put veterans' minds to rest (Morrison, 2007, p. 52).

Without a doubt humans have benefited from their bond with animals. In fact, in 1977 Dr. Bustad, Michael McColloch and Dr. Dean Katcher founded the "Delta Society," now known

as "Pet Partners," a non-profit organization dedicated towards the Human-Animal Bond

(Morrison, 2007, p. 53). The Human-Animal Bond (HAB) is defined as a

> mutually beneficial and dynamic relationship between people and animals that is
>
> influenced by behaviors that are essential to health and wellbeing of both. This includes,
>
> but is not limited to, emotional, psychological, and physical interactions of people, other
>
> animals and environment (Boe, 2008, p. 27).

Similar to the phenomenon of HAB, there is also the theory of the Human-Animal Interaction

(HAI). The HAI is the bond and/or relationship between a human and an animal. There is

research dedicated to the benefits of this bond on our emotional, physical, and physiological

health. O'Haire et al. (2013) comment on HAI as a form of social support that can "enhance

social support both directly, as a source of comfort, and indirectly, as a facilitator of human

interaction" (p. 446).

The use of animals in our treatment and care is only possible due to this bond. Both

humans and animals develop necessary bonds of attachment that are crucial to their survival and

wellbeing (Menna, et al., 2019, p. 2). It has been proven that dogs develop attachment bonds

with their owners that promote physical contact, proximity seeking, as well as stress reduction

(Wasner et al., 2020, p. 2). The long history between animals and humans, along with the ability

to form secure attachments between our species is one of the reasons animals can be used as

social lubricants.

Dr. Boris Levinson, an American psychologist, referred to dogs as "social lubricants"

(Jalongo, Astorino & Bomboy, 2004, p. 10). Levinson first noticed the positive effects of his dog

Jingles' presence had on one of his clients in 1953. The relationship that the client and Jingles

formed allowed Levinson to communicate with the patient through Jingles, building the client's

trust over time. In 1961, Levinson presented his findings of his dog acting as a "co-therapist" (Levinson, 1997, p. 37). Levinson's theory developed into "Pet Therapy" which is now known as "Animal-Assisted Interventions" (Zilcha-Mano, et al., 2011, p. 545).

Bachi and Parish-Plass (1997) note that animals incorporated into therapy can facilitate the 'therapeutic alliance' (p. 4). This alliance is an important factor in therapy in order to develop trust between therapist and client. Levinson believed that dogs provided children with the physical contact that professionals could not provide them with (Levinson, 1997, p. 59). Historically in therapy, children have been given dolls to a tool in therapy, but Levinson argued that children are aware that a toy cannot love them back or share feelings with the child (1997, p. 65). Instead, dogs are living beings that experience life which allows children to feel as if dogs possess the same feelings as they do (Levinson, 1997, p. 143). By projecting emotions and experiences onto the dog, the child can express and discuss their own feelings and experiences. Levinson (1997) claims that dogs are a mirror for children (p. 147). He explains that if the child recognizes how to behave with the dog, the child will be able to bring those behaviors to human interaction as well (Levinson, 1997, p. 147). Dogs are therefore not only a social catalyst, but also a source of comfort and belonging.

As is evident with this short introduction, this chapter focuses on providing a brief background of Animal-Assisted Interventions (AAI) and how it has developed throughout history. This chapter will introduce the problems and inaccuracies in previous literature due to inconsistent use of terminology within the field. This contextual discussion will be the starting point and focus of this study. The research questions, aims, and objectives will follow along with a brief overview of research methodology, research design, sampling process, data collection, organization and analysis will be provided to show the goals of this study. Next, there will be a

review of trustworthiness, validity, reliability, and ethical considerations. Lastly, this chapter will provide a demarcation of this study and the subsequent chapters where these topics will be address in more depth.

The Development of Animal Assisted Therapy

The 1970s introduced a few new *Animal-Assisted Therapy* (AAT) programs, such as the Human Society of Pikes Peak region in Colorado created a '*Petmobile'* program to visit nursing homes, and Dr. Leo Bustad developed AAT programs in both the Pullman Memorial Hospital and Tacoma Lutheran Nursing Home (Morrison, 2007, p. 53; Çakici & Kök, 2020, p. 120). In 1970, a survey revealed that 48% of healthcare institutions in the United States were using animals in at least one form of psychotherapy (Morrison, 2007, p. 53). In 1972 Dr. Boris Levinson discovered that one third of New York's 435 psychologists used animals in their practice and treatments (Çakici & Kök, 2020, p. 120). During this time Dr. Michael McCulloch "began 'prescribing' pets as a therapeutic option for his patients to improve quality of life" (Morrison, 2007, p. 53). In 1977, Dr. Michael McColloch, Dr. Leo Bustad and Dr. Dean Katcher formed the Delta Society, an organization dedicated to enhancing people's health and well-being through animals (Palley et al., 2010, p. 200). The Delta Society's goal was "to promote animals helping people improve their health, independence, and quality of life" and to "[expand] awareness of the positive effects animals can have on human health; removing the barriers that prevent involvement of animals in everyday life; and expanding the therapeutic role of animals in human health, service, and education" (Morrison, 2007, p. 53). The Delta Society mainly focused on the human-animal bond, but also created the first AAT certification program (Morrison, 2007, p. 53). The Delta Society became world leaders in animal certification and training (Palley et al., 2010, p. 200).

With the popularity of AAT in the 1970s and 1980s, it is important to note that the benefits of an animal's presence were not limited to therapeutic environments. Levinson (1997) refers to an animal in the classroom as a "powerful tool" as the animal allows for "learning to become reality-oriented, giving the child emotionally satisfying experiences" (p. 110). In fact, Jill Fedor, stated that having therapy dogs in school can have a positive impact on students' social interactions, participation and behaviour while building a sense of connectedness in school (2018, p. 355). Levinson (1997) suggests that an animal in the classroom provides a "diversion which dissipates tensions and relieves anxieties" (p. 109). While referencing Maslow's Hierarchy of needs, Fedor emphasized our need to belong is our second most important need. Amongst her main findings from the study is that the presence of the therapy dog also taught students how to be kind, gentle and caring towards the dog, which also allowed them to transfer those skills to their peers (Fedor, 2018, p. 356).

The presence of dogs in the classroom also lead to the discovery of academic improvements. For example, it is common for students to show signs of reading anxiety while learning how to read (Hall et al., 2016, p. 2). Donna Shaw (2013) conducted a study using a program called "R.E.A.D" which stands for "Reading Education Assistance Program" (p. 365). In Shaw's study teachers saw students gain confidence in their oral reading abilities and with their ability to independently use reading strategies. Followed by the teacher's observations, Shaw shares how parents noticed the joy for reading in their students increase significantly and a decrease in fear towards reading. One parent even said that their child began to connect meaning to what they were reading because they felt that the dog could understand the story. One student claimed that the dog comforted them while they read because when coming across a difficult word the dog patiently waited as they sounded out the word (Shaw, 2013, p. 368). In this setting,

the dog is not acting as a therapist or teacher, instead they are an engaged listener (Grove et al., 2021, p. 2).

A common theme in the literature mentioned so far comments on the significant attachment and bond between humans and animals Levinson and Shaw both provide examples of the benefits therapy dogs have on students' ability to feel connected, safe and secure (Levinson, 1997, p. 59; Shaw, 2013. p. 13). As an educator, it is common knowledge that these three feelings are a few key qualities to form an optimal learning environment for students. The literature suggests that incorporating dogs into the classroom is therefore beneficial for students. Dogs in the classroom can aid with students' connectedness, emotions, behaviour, confidence, and motivation to learn (Fedor, 2018, p. 356; Henderson et al., 2020, p. 6; Flynn et al., 2020, p. 638.

Problem Statement

There are countless ways that animals can be used to help us in our everyday life, but the difficulty is identifying the type of Animal-Assisted Intervention or program to address the desired outcome in a classroom or educational setting. Current research on AAI in the educational setting uses the terms: AAI, Animal-Assisted Education (AAE), Animal-Assisted Activities (AAA) and Animal-Assisted Therapy (AAT) (Kirnan et al., 2020; Beetz, 2013; Bassette & Taber-Doughty, 2013; & Beasley, 2013). At times, these terms are used both simultaneously and interchangeably which causes a problem for the clarity in our literature. Each form of AAI strives to assist humans with an activity or achieve a goal by the presence of an animal. The problem with these terms being used interchangeably is that each type of AAI has a different intent. Interventions through AAT aim to change a client's nature, whereas interventions through AAA aim to assist clients to complete an activity or reach a goal.

Along with the different types of AAI being used in research and education, the literature has studied various factors, such as cognitive disorders, emotional and behaviour disorders, autism, mental health, well-being, and physiological effects (Anderson, 2007, p.11; Busch et al., 016, p. 294; Chandler, 2001, para. 3; Computis, 2019, p. 18; Dice et al., 2017, p. 456; Dietz et al., 2012, p. 667, Knowles et al., 2021, p. 1). These common factors also affect the classroom environment what ultimately creates the optimal learning environment. An optimal learning environment is where students have barriers removed, feel safe, secure, and comfortable (Haidari & Karakuş, 2019, p. 444-445). Through a meta-analysis of literature, this study aims to determine the ways AAI can be incorporated into the classroom to assist in creating the optimal learning environment by assessing the benefits of AAI on students' emotions, behaviour, academic performance, and the sense of belonging. Whilst I am conducting the research on existing literature, I will need to keep in mind the following to direct my meta-analysis: 1) search for data that explains the exact purpose, uses and benefits of AAI; and 2) collect and analyze data on AAI while documenting their intentions to determine if they are plausible for the educational setting. It is my hope that this meta-analysis will provide educators with the knowledge of AAI and provide reasons why to incorporate AAI to enhance the optimal learning environment.

Theoretical Framework

Humans and animals have a dynamic relationship that has been studied and referred to as the Human-Animal Bond (HAB), which suggests that animals and humans can attach to each other. This concept is similar to John Bowlby's Attachment Theory. Bowlby believed theory of attachment theory to focused on infants and their caregiver, typically the mother (Geist, 2011, p. 246). The relationships depend on two concepts, the internal working model (IWM) and the secure base (Pfaller and Kiselica, 1996, p. 209). The IWM is

the internal representation or schema that an infant or young child forms about him or

herself and a caregiver relationship. This internal representation forms the infant's

expectations about his or her worthiness in terms of being cared for and the availability

and dependability of adults in the caregiving role (Pfaller and Kiselica, 1996, p. 209).

The secure base is "the safe port or haven that is provided" by their caregiver or attachment

figure (Pfaller and Kiselica, 1996, p. 209). Bowlby drew on concepts from "ethology,

cybernetics, information processing, developmental psychology, and psychoanalysts" to form the

base of his theory (Bretherton, 1992, p. 759).

Attachment theory suggests that children will display behaviours such as proximity

seeking and separation avoidance with their secure base, while also using their secure base for

protection and a safe place to return to if the child is scared or nervous (Jalongo, 2015, p. 395).

Jalongo (2015) suggests that not all attachments are between human-human relationships and

that animal companions can be substitutions. Children have been observed demonstrating

attachment behaviours such as proximity, physical contact, longing for reuniting and

communication through both verbal and non-verbal cues with their animal companion.

Furthermore, in homes with pet dogs, the dog is often viewed as a family member, often pairing

children and dogs together to help teach the child (Jalongo, 2015, p. 396). Having dogs as crucial

members to the everyday family, it is no surprise that there is a growing awareness of children

forming intense bonds with their pets, similar to those of attachment theory.

While compiling literature, Zilcha-Mano, et al. (2011) identified a common theme,

suggesting that the human-animal bond possesses the "prerequisites for an attachment

relationship – proximity seeking, safe haven, secure base, and separation distress… [and]

indicates that pet owners feel close to their pets and seek and enjoy this closeness" (p. 346).

Furthermore, the attachment between humans and their pets provided the pet owner with "a source of love, acceptance, and emotional support… [and] pet owners tend to feel that their pet loves and accepts them unconditionally" while providing them with a sense of reassurance and stability" (Zilcha-Mano, et al., 2011, p. 346).

Research Question

Based on the stated problem, the following main research question for the study is: What is a comprehensive composition of Animal-Assisted Interventions (AAI) derived from a meta-synthesis of the literature, to assist educators in creating the optimal learning environment? This main research question has the following supporting questions:

- o What is the optimal learning environment?

- o What are the different types of AAI?

- o What are the benefits of AAI on the optimal learning environment?

Research Aims and Objectives

This study aims to present a composition of Animal-Assisted Interventions (AAI) derived from a meta-synthesis of the literature to assist educators in creating the optimal learning environment.

This main research aim has the following supporting aims:

- o To define the optimal learning environment

- o To gather data on the types of AAI

- o To outline how AAI benefits the optimal learning environment

Overview of Research Methodology

Research Design

To address the research questions, a review of current literature will be conducted through qualitative and meta-synthesis designs guided by the uses of Animal-Assisted Interventions and impact on the optimal learning environment in an educational setting.

Sample

Due to AAI being a relatively new area of study, resources will be both scholarly and non-scholarly sources. Databases through the Trinity Western University (TWU) library and search engines such as Google Scholar for scholarly resources as well as non-scholarly resources found through Google will be used in data collection. Selection criteria for each data set include literature that a) covers information on Animal-Assisted Interventions, b) have preferably, but not limited to literature publication date within thirty years, c) preferably, literature published in North American.

Data Collection, Processing, and Analysis

Data will be reviewed under the following procedure: 1) identifying online resources; 2) compiling literature from databases and reliable web sources using descriptive terms and keywords; 3) verifying studies relate to the set search criteria; 4) examine the reference sections of all identified studies for additional studies and literature and 5) recording bibliographic information and notes on each article selected. Data collection, processing and analysis are discussed in more detail in the methodology section of Chapter Two (see page 18).

Trustworthiness, Validity, and Reliability

This study intends to represent all data from literature in an unbiased, systematic, and ethical matter. This study's trustworthiness looks at the confirmability, credibility,

transferability, dependability, and authenticity (McGregor, 2018, p. 220-221). Thorough

documentation and referencing supports the validity and trustworthiness of this study, as a paper

trail which can be followed will be clearly demarcated. Using proper referencing to provide a

paper trail to guide the reader and other researchers in future studies. The paper trail provides

evidence of credibility of the study (Nowell, et al., 2017, p. 6). This will also provide readers

with evidence of decisions and choices made throughout the study. by providing evidence for the

decisions, choices and conclusions made within this study, the reader and researchers are

provided with an unbiased and trustworthy data (McGregor, 2018, p. 220).

Possible Limitations

Limitations inherent to any published literature are possible in this review. First, the

literature reviewed may have been limited due to accessibility. Second, some studies use terms

interchangeably which may result in misinterpretations. Third, the studies included psychology

and education databases and may have missed potential studies beneficial to this study.

Ethical Considerations

The author declares no conflict of interests and no clear ethical considerations. All

sources of data are acknowledged and referenced. As a meta-analysis, the data has been

synthesized and interpreted with the intent of providing an unbiased conclusion. This study will

therefore present an honest and subjective outcome, without fabrication or misrepresented data.

Due to the nature of this study and the absence of participants Trinity Western University's

(TWU) Research Ethics Board (REB) approval was not required, but this study was closely

monitored by the director of the TWU's Master of Artis in Educational Studies - Special

Education, Lara Ragpot, who is also the supervisor of this study.

Conclusion

This chapter provided a brief background of how Animal-Assisted Interventions (AAI) was formed, the problem statement, reason for study and a summary of methodology. This chapter also briefly outlines the trustworthiness, validity and reliability, ethical considerations, and demarcation of this study.

Demarcation of this Study

This review consists of the following chapters. Chapter One is an introduction to provide the reader with an outline, overview, content, and theory upon which this study is grounded. Chapter Two will present the method of which data was collected and analyzed. Chapter Three will present the literature review which has a twofold purpose for this study: first, it will present information on Animal-Assisted Interventions (AAI), the impact of AAI on children, and how AAI can foster an optimal learning environment; and second, it provides the raw data for meta-analysis of this study. Chapter Four will contain the results of the analysis. Chapter Five will discuss these results and conclude the study with a summary, a discussion of limitations and recommendations for future research.

CHAPTER TWO: METHODOLOGY

The purpose of this study was to find out how Animal-Assisted Interventions (AAI) derived from a meta-synthesis of the literature could be utilized in creating an optimal learning environment. Typically, Chapter Two discusses the relevant literature in a specific focus or field of study to provide context for the current research and ideas proposed by theorists. Since this study is a meta-analysis of the literature, the literature discussion forms the raw data which was analyzed in this study. This chapter therefore focuses on providing the reader with an outline on how the literature, as data, was gathered, analyzed, and studied to respond to the research question. The literature review chapter will follow in Chapter Three.

In brief, this chapter outlines the methods involved in gathering the data; thus, the research design employed in the sampling process; a discussion of how the data were organized and analyzed and a brief discussion of how the data were organized and analyzed; and last is a brief discussion on the ethics and validity of this study.

Research Design

To address this study's research question, a qualitative meta-synthesis approach was applied to analyze data from the literature. According to Mertens (2020), qualitative methods are designed to "prove an in-depth description of a specific program, practice or setting" (p. 342). Erwin et al. (2011) describes qualitative meta-synthesis as "an intentional and coherent approach to analyzing data across qualitative studies. It is the process that enables researchers to "identify a specific research question and then search for, select, appraise, summarize and combine qualitative evidence to address the research question" (p. 186). Erwin et al. (2011) claim that synthesis as a research method allows the researcher to identify common themes, to compare and contrast different groups, and provide deeper insights that may not be available in a singular

study (p. 187). When combining the methods of qualitative studies and synthesis there is room for "a greater contribution to understanding the overall efficacy of interventions" (Erwin et al., 2011, p.187). By using a qualitative meta-synthesis approach as researcher, I can integrate literature as data and analyze findings across studies, disciplines, and sources to answer this study's research question.

This study used a vast range of sources due to the complexity of AAI. This study utilized selective and purposeful sampling from different data sources aside from the typical data sources found in academic sources and scientific journals. This study incorporated studies, articles and papers on AAI and the optimal learning environment found through both TWU's online database as well as Google Scholar. At times, when there was a gap in the literature through these databases, Google was used to find organizations, websites and articles focused on the same topics to fill the gap and further guide the research. As researcher, I searched for themes across varying sources of literature which functioned as the research data. These included qualitative, quantitative, and mixed method studies, along with case studies, reports, websites, organizations, and news articles. Including sources that are not founded through scientific databases are due to two key reasons: firstly, AAI is a relatively new field which means that there is not a limited amount of literature that has been published focusing on AAI in an educational setting. Similarly, being a newer concept, AAI is still growing and forming, meaning that terminology has changed and been misused in previous studies.

Including sources from non-scientific databases allows for the inclusion of programs, organizations and websites that are specialized in AAI and are currently active in the field of AAI. Thus, including non-academic sources provides a wealth of literature that is available through other organizations and other websites. An example of these websites is Pet Partners

(https://www.petpartners.org) which is the present-day version of the Delta Society from the 1970s which paved the way for AAI. Without the use of this organizations' website this study would have continued the trend of current AAI research by using incorrect terminology and would have left the study significantly less informed. Moreover, this study's intent was to explore the types of AAI and how to incorporate them into the classroom.

Sample

Theoretical sampling was used throughout the process of collecting data for this study. As my understanding of AAI grew, the awareness of what needed to be researched and analyzed also grew. To gather research, I used primary databases such as ScienceDirect (https://www.sciencedirect.com), JSTOR (www.jstor.org), Sage Journals (journals.sagepub.com), ERIC (https://eric.ed.gov), and APA PsychInfo (https://www.apa.org) through the Trinity Western University library's searchable database, as well as both Google and Google Scholar to collect data. Descriptive terms and keywords were used to gain the initial data and information to form definitions and understanding. These key terms are: *Animal-Assisted Interventions (AAI), Animal-Assisted Education (AAE), Animal Assisted Therapy (AAT), Animal-Assisted Activities (AAA), Therapy Dogs* and *Therapy Animals.* A second set of data was also collected to provide a deeper look into the relationship between animals and children in an educational setting. These key words are *dogs, schools, classroom, elementary, anxiety, emotions,* and *behaviour.*

Selection criteria was used to find sources that would create the data for the study that would be analyzed. The following provide more specifics of the parameters that I used to search for information in each set of data. For the collection criteria of the first data set (Reviews of Animal-Assisted Intervention), the literature had to a) offer information about Animal-Assisted

Interventions, b) have a publication date within the last 60 years; c) preferably, literature

published within North America. The selection criteria for the second data set (Studies of

Animal-Assisted Interventions) include a) literature providing data on AAI in educational

settings, b) have a publication date within the last 60 years; c) preferably literature published in

North American.

Within initial research on AAI, it became apparent that this is still a new, developing and

changing field. While searching for useable data, I quickly realized the initial research and

findings were necessary for this study increasing the publication date from the last 30 years to

the last 60 years. This is also due to the lack of research and the inconsistent terminology within

current literature. Initial searches were completed by briefly reading abstracts and introductions

to determine whether a specific source would meet the selection criteria. Sources that were

deemed suitable were downloaded and saved. Data from professional blogs, websites,

organization's websites and news articles were also retrieved, recorded and saved.

The reference sections from selected articles and websites were also reviewed to find

additional relevant literature. The vast data search and collection provided a significant amount

of literature from various types of studies including qualitative, quantitative, mixed methods and

case studies. The inclusion of websites, organizations and blogs also provided significant

information for this study. All peer reviewed studies and websites (all included and cited)

provide the body of discussion of AAI and the benefits in Chapter Three.

Organization and Analysis of Data

As mentioned above, two sets of data were created to examine the aims of this study.

First, the data from reviews of AAI, its terminology, settings, and outcomes as seen in Appendix

A, Table 1 (p. 69). The second set of data focused on previous studies of AAI and the benefits of

AAI as seen in Appendix A, Table 2 (p.73). These data sets were organized and analyzed to

abstract the consist themes of this study as seen in Appendix A, Table 3 (p. 81).

The data collection, presentation and data analysis were done in four steps (see Figure

2.1). The first step was to extract data from the discussion of each category in the literature – as

discussed and presented in Chapter Three. The second step was to summarize each discussion of

literature into tables (See Appendix A, Table 1, p. 69; Table 2, p. 73). This step provided a

manageable table to analyze in comparison of the lengthy discussion in Chapter Three. The third

step was to collapse the data from Table 1 and 2 into Table 3 (p. 81) where the categories of the

optimal learning environment were analyzed. Through this method, the data collected and

summarized in Steps 1 and 2, are further summarized and compiled in Step 3. Steps 1 – 3 are

crucial to the process as they form the themes that are extracted in Step 4. In Step 4 of data

analysis is also the last that two sets of data are analyzed separately. In final step, the themes

from data sets 1 and 2 are unified into the findings of this study. This led to the final findings for

this study as it complemented the methods and benefits of AAI on the optimal learning

environment.

Figure 2.1 *Data Organization and Analysis Process*
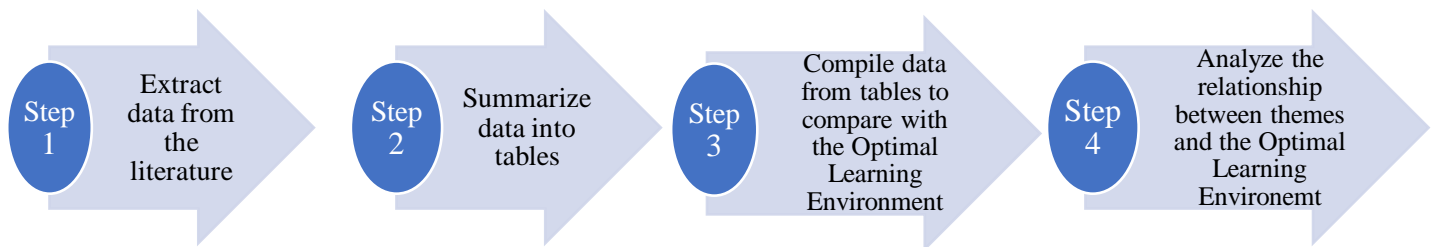
The following section will provide an in-depth discussion of the specific focus of each

data set, and with more elaboration of the steps in the analysis process. My intent is to clarify the

reasoning behind the various steps that I used to represent the raw data from numerous sources

and literature (discussed in Chapter Three), in a cohesive and summarized method by means of a meta-analytic process (Chapter Four).

In-Depth Description of the Analysis Process

The two sets of data were generated to pursue the aims of this study. One set of data was focused on previous reviews of AAI, the purpose of AAI and the benefits of AAI. The second set of data focused on previous studies of AAI and their findings. As this study focuses on the ways in which educators could use this information as a resource in their practice, the abstracted themes from this data set focus on the benefits of AAI for children and adolescence. The data will focus on the factors that create the optimal learning environment, including students' emotions, behaviours, and academics. The data therefore include information that may not be specific to the educational setting. The reason behind including this additional information not specific to the educational setting is that the analysis will focus on the effects of AAI on students, the educational setting, and optimal learning environment. The reason behind including this information is that there are multiple types of AAI and through literature there is inconsistent terminologies being used. By collecting and including the data on all forms of AAI and the effects on students in multiple environments will provide the research with more informed results and benefits.

The themes that arose (See Appendix A, Table 3, p. 81) included motivation, emotions, behaviour, depression, anxiety, stress, safety, academics, and connectedness. The themes from data set 1 and 2 were compiled into this table. The combination of the effects of AAI and the benefits in creating the optimal learning environment for the final four themes of this study: motivation, mental health and well-being, academics, and connectedness. These themes are discussed further in Chapter Four.

While analyzing the literature studies that find no significant results, contradicting information, or incompatible results will still be included as they will still provide valuable information regarding AAI and provide insight for future studies. Table 2 in Appendix A (p. 73) will show the results of each study under the column 'Findings'. The results of these studies and their findings will assist in forming recommendations for future research.

Ethics and Validity

There is no conflict of interest in completing this study. there are no clear ethical considerations except that al sources of information and data utilized are acknowledge for their contribution to the study. This study's intent is to represent all data from the collected literature in an unbiased, systematic, and ethical manner. The study's trustworthiness examines the credibility and transferability of literature (McGregor, 2018, p. 220-221). Proper documentation and referencing support the validity and trustworthiness of this study (Nowell et al., 2017, p. 6). This will also provide readers with evidence of decisions and choices made throughout the study. Proper documentation of all data and decisions made upholds the validity and trustworthiness of this study (McGregor, 2018, p. 220). Through the proper referencing and documentation of decisions and findings made throughout this study will ensure that other researchers will be able to replicate this study.

Conclusion

This chapter discussed the qualitative, meta-synthesis research design used to achieve the purpose of this study. The selective and theoretical sampling process, and how the data sets were organized and analyzed. This was then followed by the ethical considerations and validity of this study. In Chapter Three, I will present the literature review and thus the raw data of this study.

CHAPTER THREE: LITERATURE REVIEW

This chapter focuses on providing the literature review for this study. This chapter is section into two sections. The first section will examine the factors that create an optimal learning environment. This will provide information to look for while analyzing Animal-Assisted Interventions (AAI) and the impact on the classroom environment.

The second section is focuses on the different types and uses of AAI. Within this section, I will present the uses, benefits, classifications, and requirements for each form of AAI. The articles and studies used for this section of the literature review will be summarized into two tables, Table 1 (Appendix A, p. 69) will represent the data on literature reviews and Table 2 (Appendix A, p. 73) will represent data on studies regarding AAI. The themes from these two sections will be compiled into Table 3 (Appendix A, p. 81). This table will represent how AAI impacts the factors of the optimal learning environment. The data from Table 3 will be discussed and analyzed in Chapter Four.

Optimal Learning Environment to Support Student Learning

As a teacher, the phrase "Optimal Learning Environment" is used loosely while describe the 'optimal' classroom environment or class climate. The definition of an optimal learning environment differs from person to person. Sean Kelly (2014) defines an optimal learning environment as "one characterized by appropriately high task challenges and expectations for mastery, combined with motivational and emotional support" (p. 208). Kelly (2014) continues to describe an optimal learning environment involves student engagement which is "the simultaneous occurrence of interest, concentration and enjoyment" (p. 208). Cheng (2009) refers to an optimal learning environment as "conducive to questioning, discovering, creating conversation and… [leads] to understanding" (p. 73-74). Lackney (1999) defines optimal

learning environments as "motivational places… that create new possibilities for learning…
[and] go beyond the functional to the inspirational" (p. 4). Overall, the optimal learning
environment is one where students' academic, social and emotional needs are met in order for
them to learn.

Cantor and Gomperts (2020) claim that "children's environments, experiences and
relationships drive how they learn and develop even more than their genes" (p. 12). This is due
to the developing brain being a sensitive and malleable structure (Cantor & Gomperts, 2020, p.
12). Cantor and Gomperts (2020) suggest that in order to best support the developing brain,
educators need to design a learning environment that nurtures skills while buffering against and
alleviating stress and trauma (p.12). It is important that these learning environments promote
"physical and emotional safety, predictability and sense of belonging are [an] example of
positive context" (Cantor & Gomperts, 2020, p. 13). Fretz (2015) supports the need for an
optimal learning environment through invitation education and providing students with
opportunity to have choice in what they learn. Along with choice, Fretz (2015) encourages
acknowledging students' feelings, and to try to minimize stress and pressure related to education
(p.28). To provide a safe environment for the developing brain, educators need to provide a
"positive context" by developing positive relationships with students to help release oxytocin to
counter cortisol levels (Cantor & Gomperts, 2020, p. 13).

In Jeffery Lackney's (1999) keynote presentation he quotes Jonathon Kozol's book
Savage Inequalities where he highlights that "the point is that all school reforms on earth are
worthless if kids have to come to school in buildings that destroy their students" (p. 6).
Throughout his presentation Lackney acknowledges the importance of community, both the
physical and social needs of children, the need to foster self-concepts and self-esteem, and the

commitment to providing the best for students. Haidari and Karakus (2019) believe that an optimal learning environment is a welcoming and safe environment where students feel secure (p. 445). This environment provides both "participative and rich learning opportunities" for students (Haidari & Karakus, 2019, p. 445).

Lackney identifies five attributes in creating the optimal learning environment. The first being community, getting the parents involved and making education and collaborative effort (Lackney, 1999, p. 5). The second focusing on having positive leadership within the school and allowing teachers the time and space to better themselves to provide creative and educational opportunities for their students (Lackney, 1999, p. 5). The third attribute is having a student-centred learning environment where students of diverse needs are supported (Lackney, 1999, p. 5). This includes having a variety of learning spaces, large and small group instruction, individual instruction, reflection, technology, experimental learning, outdoor learning and so much more (Lackney, 1999, p. 5). The fourth attribute for the optimal learning environment is to create an environment that is developmentally appropriate and encourages positive social behaviours (Lackney, 1999, p. 5). The final attribute of an optimal learning environment is one that supports student performance and academic achievement (Lackney, 1999, p. 6).

Haidari and Karakus (2019) believe that "creating a safe space in the classroom, where student identity and individuality are valued and nourished is essential in enforcing student connectedness to the learning environment" (p. 445). This optimal environment is one where students feel connected to their teacher and classmates" (Haidari & Karakus, 2019, p. 445) They suggest that through establishing positive and trusting relationships, students are able to develop moral and trust to reveal their true thoughts and opinions rather than worrying about their self-image (Haidari & Karakus, 2019, p. 445). Similarly, Fretz (2015) comments on the powerful

internal messages that we receive and interpret daily that make both positive and negative impacts on our identity, sense of self, and self-esteem (Fretz, 2015, p. 29). A way to use these powerful internal messages to benefit an optimal learning environment is for teachers to intentionally interact with students in a way that communicates optimism, respect, trust, and care (Fretz, 2015, p. 29). Optimal learning environments are intentional in the way they form community, relationships and remove barriers. Fretz (2015) identifies three ways to create an optimal learning environment: student autonomy, competence, and relatedness (p. 29.). This can be achieved by building positive relationships that foster confidence, encourage students to accept challenges, and explore new opportunities (Fretz, 2015, p. 29).

An optimal learning environment is one where the barriers that prevent students from an equal and equitable education are removed. These barriers are removed by provided students with an environment where they feel safe, feel encouraged and are motivated. This is done by building relationships, fostering peer relationships, and providing a place where everyone feels as if they belong. A learning environment where diverse learning needs are met, and students feel both supported and encouraged in their education. What is evident from the literature is that an optimal learning environment is one where students feel that they belong, encouraged, motivated, encouraged, and safe (Haidari & Karakus, 2019, p. 445). One way to achieve this environment is incorporate animals into the classroom. Recently introducing animals into the classroom has become increasingly common to assist with student anxiety, belonging and academic achievements.

The Effects of Animal-Assisted Interventions (AAI)

AAI is still a new phenomenon that is growing and gaining popularity and interest across multiple fields. Brelsford, Meints, Gee and Pfeffer (2017) state that AAI has included various

species of animals including, dogs, guinea pigs, rabbits, horses and various farm animals in both

therapeutic and educational settings (p. 1). According to the website "Pet Partners," formally

known as the Delta Society, AAI are "goal-oriented and structured interventions that

intentionally incorporate animals in health, education and human service for the purpose of

therapeutic gains and improved health and wellness" (Pet Partners, A Beginner's Guide to

Animal-Assisted Intervention Terminology, 2019, para. 4). While AAIs include animals, most

commonly dogs, into intervention it is important not to mistake these therapy animals with

service animals. Sandt (2019) explains that therapy animals should not be confused with service

animals, as service animals cannot be removed from their designated human (p. 106). The

American Medical Association also clarifies that the basic use of service animals that are solely

trained to perform specific tasks for people with disabilities are not considered AAI (American

Veterinary Medical Association, Animal-assisted interventions: Definitions, 2021, para. 9).

AAI is a broad term that encompasses any intervention that involves an animal in the

process (O'Haire, Guerin, & Kirkham, 2015, p. 1). All types of AAI involve animals, but the

level of involvement varies, the animal could be a part of a volunteer therapy animal team under

direction of a professional or handler, or the animal may belong to professional or patient

themselves (Pet Partners, A Beginner's Guide to Animal-Assisted Intervention Terminology,

2019, para. 4). The Animal Assisted Intervention International website emphasizes that AAI is

goal-directed and that the design is meant to promote or improve physical, social, and emotion

health as well as improve cognitive functioning (Animal Assisted Intervention International,

Animal Assisted Intervention, 2019, para. 1). These goals are specific to each person's needs,

and they are measured and observed throughout the intervention (Animal Assisted Intervention

International, Animal Assisted Intervention, 2019, para. 1). The various types and settings of

AAIs can range from very structured treatments to relaxed drop-in sessions. Busch et al. (2016) refer to AAI as an umbrella term that includes Animal-Assisted Therapy (AAT) and Animal-Assisted Activity (AAA), both of which include animals to enhance patient care (p. 293).

AAI has been proven to have benefits on psychological and physiological health (Brelsford et al., 2017, p. 1). It has been incorporated into healthcare, physical health, mental health, rehabilitation, psychiatrics, prisons, schools and nursing homes (Hediger et al., 2019, p. 2). AAI has been proven to decrease symptoms of depression, anxiety, emotional and behavioral symptoms, metal disorders, stress, and schizophrenia, while simultaneously increasing socialization mood, motivation, and attention (Brelsford et al., 2017, p. 1-2). Along with psychological and physiological benefits, Linder et al. (2018) state that AAI has a positive impact on a child and their ability to read (p. 324).

There has been moderate effectiveness using AAI for those with autism, medical difficulties, behaviour problems, and emotional well-being (Shen et al., 2018, p. 204). Shen et al. (2018) found that AAI fostered a sense of normalcy, belonging and companionship (p. 205). AAI has shown to increase oxytocin production, decreased cortisol levels, blood pressure and galvanic skin measurements (Brelsford et al., 2017, p. 2). The relaxing effect that animals have on patients in AAI programs is a result of sensory input through four sense, olfactory, tactile, auditory and visual (Johnson, 2011, p. 183). In other words, the animal's presence triggers our senses, we see, hear, smell and feel the animal. Johnson (2011) claims that when the animal is present "the patient sees and smells the [animal], pets and talks to the [animal] and its handler, listens to the noises made by the [animal] and hears the handler's interpretation of the [animals] behaviour" (p. 183). Johnson (2011) continues by stating that the presence of the animal causes a

decrease in serum cortisol levels, blood pressure, heart and respiratory rates" reinforcing that AAI is beneficial to those who struggle with anxiety (p. 186).

AAI intentionally include or integrate animals as a part of the therapeutic process (Shen et. al., 2018, p. 203). AAI is an umbrella term that represents "a very complex system of relational feedbacks that start with bodily gestures and attitudes and with the activation of emotional sense-motor models between the two species" (Menna et al., 2019, p. 2). Furthermore, AAIs are described as systems that have "relational dynamics of living beings of two different species… with all the parts interacting and influencing each other to make a result that is greater than its parts" (Menna et al., 2019, p. 3). The three main types of AAI are: Animal-Assisted Therapy (AAT), Animal-Assisted Activities (AAA) and Animal-Assisted Education (AAE).

Figure 3.1 *Animal Assisted Intervention (AAI)*

Animal Assisted Intervention (AAI)

| AAT | AAA | AAE |
| Animal Assisted Therapy | Animal Assisted Activity | Animal Assisted Education |
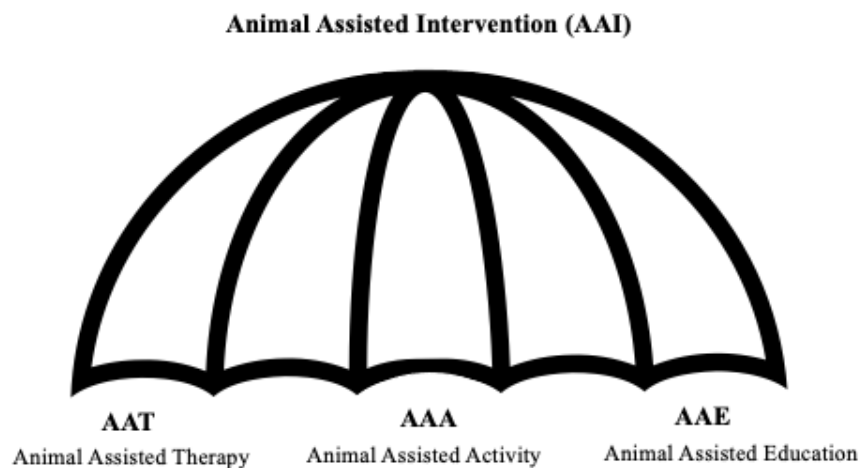
Understanding Animal-Assisted Therapy (AAT)

Animal-Assisted Therapy (AAT) is a branch of AAI that uses trained and certified animals to assist in meeting therapeutic goals (Zents, Fisk & Lauback, 2017, p. 82). AAT is a goal-directed intervention that includes a certified animal in the therapy process to enhance the treatment process which is document and monitored (Brelsford et al, 2017, p. 293). AAT

requires a health or human service professional as well as a trained and certified animal. The AAT specialists are not strictly therapists, they can include "nurses, practitioners, physicians, physical and occupational therapist, social workers, psychologists, and licensed counselors" (Morrison, 2007, p. 53). The animals incorporated into AAT are considered working animals that have handlers who have been screened, trained and who meet specific criteria in order to partake in AAT (Geist, 2011, p. 244). The handler and therapist (or other professional) work as a team. The therapist sets goals, guidelines and for the interactions between the client and therapy animal to properly measure the progress (Geist, 2011, p. 244). The goal of AAT is to improve "human physical, social, emotional, and/or cognitive functioning" (Morrison, 2007, p. 53).

AAT is not a standalone treatment but rather included to enhance traditional approaches to therapy in assisting the development and maintenance of "the therapeutic relationship, facilitating the tasks of therapy, and providing a means of addressing symptoms" the client may be experiencing (Signal, et al., 2017, p. 81). Lubbe and Scholz (2013) explain that the relationship that forms between the client and the therapy animal is not intended to replace the relationship between client and therapist but rather act as a bridge (p. 117). Animals act as an object that clients can project their feelings and experiences onto to work through them (Lubbe & Scholz, 2013, p. 117). Incorporating animals through "AAT has been promoted as a way to create a safe environment of trust and acceptance" (Dietz et al., 2012, p. 667).

AAT has been seen to provide support in physiological, psychological, and social support (Zents, Fisk & Lauback, 2017, p. 82; Booten, 2011, p.5; Brelsford et al., 2017, p.1; Busch et al., 2016, p. 307; Dell et al., 2015, p. 337). Therapy animals can assist clients in ways humans cannot. Animals can provide clients with physical touch that would be considered inappropriate for professionals. Children can form bonds with animals even when they have learned to not trust

adults (Zents, Fisk & Lauback, 2017, p. 83). Children can share their thoughts and feelings with animals without the fear of judgement (Geist, 2011, p. 249). AAT goals include improving child's communication skills, reducing behavioral problems, enhancing self-confidence and concentration, reducing distress, anxiety, and depression in children (Motarabesoun & Tabatabael, 2016, p. 28). Lubbe and Scholz (2013) state that AAT also provides support for learning and emotional well-being of students (p. 117).

AAT has been shown to reduce hyperactivity, sensory-seeking behaviours, inattention, distractibility, and improve social functioning, social cognition, social inclusion, relationships, and attitudes towards learning (Jurickova et al., 2020, p. 679). Flynn et al. (2020), found that AAT promotes self-regulator behaviours, increased social-emotional competence, decreased disruptive behaviour, anxiety, attention, depression, emotional challenges, self-esteem, engagement, and retention (p. 632). The human-animal relationship developed through AAT promotes learning, comfort, a sense of safety, calmness, and increased morale (Booten, 2011, p. 3). AAT has been proven to be successful with assisting those who live with dementia, schizophrenia, developmental disabilities, autism, posttraumatic stress, and emotional behavioural disorders (Flynn et al., 2020, p. 631).

Similar to AAT another popular form of AAI, is Animal-Assisted Activity (AAA). AAA is less formal and does not require the guidance of a health or human services professional. One of the main differences between AAT and AAA is the nature of their intent. Interventions through AAT aim to change a client's nature, whereas interventions through AAA aim to assist clients to complete an activity or reach a goal.

Exploring Animal-Assisted Activity (AAA)

A distinction between Animal-Assisted Activity (AAA) and AAT is the absence of goals related to treatments. Instead, AAA does not include specific therapeutic goals. AAA provide opportunities for "motivational, educational and recreational benefits to enhance quality of life" (Busch et al., 2016, p. 294). It is less formal than AAT and is used commonly in social visits with a therapy animal (Lubbe & Scholz, 2013, p. 117). AAT implies that it will take place in a therapeutic setting as it is meant to enhance the therapeutic experience, AAA on the other hand can take place in various environments. AAA can be held in a variety of environments by a range of people including trained professionals such as a therapist, or a paraprofessional or even a volunteer with a certified animal or animal that meets specific criteria (Busch et al., 2016, p. 294). AAA has three features that distinguish AAA from AAT, they are the relaxed nature of AAA, the absence of documentation and/or goal outlines and does not require an overseeing professional (Shaw, 2013, p. 365). These visitations can consist of professionals and/or volunteers bringing animals to visit patients, nursing homes, correctional facilities, schools, healthcare offices (Morrison, 2007, p. 54).

Sokal (2020) comments on how AAAs are intended to be proactive instead of reactive (p. 275). The benefits of Animal-Assisted Activities (AAA) are similar to the ones listed previous regarding AAI. AAA has been used with children who have experienced trauma and abuse and has shown to improve symptoms of depression, anxiety and PTSD (Fodstad et al., 2019, p. 153). Research on AAA suggests the mere presence of an animal can decrease social isolation and build mental wellness and resiliency (Sokal, 2020, p. 275). Knowles et al. (2021) share that AAA shows decrease in problem behaviours, improved social skills, increase motivation, and cognitive functioning (p. 2).

In settings that involve children, AAA can provide children with the opportunity to touch, cuddle and hug the animal, behaviours that are not necessarily appropriate in therapeutic environments (Sokal, 2020, p. 275; Zents et al., 2017, p. 83). The physical touch allows for children to have tactile and social-emotional stimulation (Boyer & Mundchenk, 2014, p. 29) Providing children with the opportunity to work with animals in AAA also provides them with the opportunity to demonstrate competency, care, sense of authority, and responsibility (Busch et al., 2016, p. 310). Dell et al. (2015) comments on how AAA allows for people to make attachment bonds with animals that are perceived as unconditional which induces relaxation and (p. 334).

It has become increasingly popular across Canada to see AAA visitations at university campuses during exam season to aid students with stress management (Dell et al., 2015, p. 334). The calming effects of AAA are one of the reasons why AAA is included in the educational setting. This is one of the areas where the AAI terminology can be misleading or misused. Unlike AAT, AAA does not monitor, measure and review progress in its programs as it does not have therapeutic goals it is intended to enhance quality of life. When AAA is brought into the educational setting, educational goals are often present which moves away from AAA and into Animal-Assisted Education (AAE).

Understanding Animal-Assisted Education (AAE)

Animal-Assisted Education (AAE) is described as "goal-oriented, planned, and structure interventions directed and/or delivered by educational (and related) service professionals… they act as a support for educational interventions, defined as… an action through which individuals develop or perfect intellectual, social, and physical faculties, and attitudes" (Santaniello et al., 2020, p. 2). AAE can be run in individual settings, groups, and whole class settings. The goal is

to "influence social behavior, socioemotional competence, and the empathy of the children and to improve the classroom environment, motivation, and discipline" (Grove et al., 2021, p. 2) Therapy animals can impact cognitive tasks, social behaviour, empathy, and aggression through social lessons with the animal (Nakajima, 2017, p. 6). Dice et al., (2017) explain that AAE can assist with understanding emotions, maintaining respectful behaviours towards peers and promote both awareness and responsibility through the interaction with animals (p. 457). Studies have shown that students finish tasks faster, feel calmer, relaxed, less hyperactivity symptoms, less stress and move motivated when therapy animals are present (Nakajima, 2017, p. 11). Sandt (2019) lists several benefits of Animal-Assisted Education such as,

"decreased cortisol levels, lowered heart rate, lowered blood pressure, improved social attention, improved social behavior, improved quality of interpersonal interactions, reduced anxiety, elevated mood, improved empathy, enhanced learning, diminished aggression and reduced perception of pain… reduced loneliness and isolation, improved memory, and improved problem-solving skills during human—animal interactions (p. 104).

AAE also allows for students to learn about animals, training required for animals, how to care for animals and be a responsible owner, and how to show kindness (le Roux et al., 2014, p. 657). Through interacting with therapy animals, students develop the ability to have and show empathy towards each other (le Roux et al., 2014, p. 657).

The therapy animals also act as a role model of good behaviour, as the animals learn commands and respond to them appropriately which encourages children to also follow instructions as well (Nakajima, 2017, p. 6). AAE in preschools found an increase in focus, motivation, memory tasks, on-task behaviour, and ability to recognize objects faster (Sandt,

2019, p. 104). AAE has also been proven to assist in socio-emotional developmental skills that

assist in emotional comprehension which is the ability to identify, predict and explain emotions

(Scandurra et al., 2021, p. 1505). Not only has AAE been found to increase self-esteem, but it

also improves students' self-perceptions of their competence in multiple domains (Schuck et al.,

2018, p. 2). AAE has been found to foster feelings of normalcy, improve behavioral activation,

and sense of belonging (Shen et al., 2018, p. 205). Sokal (2020) found AAE caused a decrease in

isolation and loneliness (p. 275). Therapy animals in the classroom have improved student

emotional stability and positive attitudes and self-esteem in those students with emotional

disorders (Friesen, 2010, p. 262). Therapy animals lead to less negative interactions between

students, increase in positive language, decreased distractibility, improved relationships,

increased eye contact, decreased tantrums, decreased learned helplessness, and increased

problem solving and empathy (Zents, Fisk & Lauback, 2017, p. 83).

     A popular area of AAE is literacy and reading ability. Reading difficulties negatively

impact emotional development and cause anxiety and stress while learning how to read (le Roux

et al., 2014, p. 656). AAE has been shown effective with both struggling readers and those with

specific learning disabilities (le Roux et al., 2014, p. 656; Dragani-Reagan, 2019, p. 28). Studies

have also found that reading to therapy animals increases self-esteem, decreases anxiety and

confidence while reading (le Roux et al., 2014, p. 657; Grove et al., 2021, p. 2; Lubbe & Scholz,

2013, p. 127; Motarabesoun & Tabatabaei, 2016, p. 35; Sokolwska et al., 2014, p. 2). Sandt

(2019) found that reading with a therapy animal improves reading fluency and comprehension

(p. 104). Studies found that students with ADHD experience an increase in focus while reading

with therapy animals (Jurikova et al., 2020, p. 678). There are some popular reading programs

designed with AAE and AAA in mind mentioned throughout the literature including: R.E.A.D

(Reading Education Assistance Dog), BARK Reading & Therapy Dogs, Sit, Stay & Read!, Reading with Rover, and D.E.A.L. (Dogs in Education Assisting with Literacy). All of which have structured educational environments where students read with dogs.

As seen above, AAI has many benefits on the classroom but there is always a risk of working with live animals. Some of these concerns may be for child safety, classroom sanitation, or cultural concerns. Other concerns may focus on the animal's safety and wellbeing. The following section will discuss all concerns in more depth.

Limitations and Risks involved in AAI

There is a gap in the literature in regard to the animal's quality of life. Wanser et al. (2020) question this when commenting on the lack AAI research being "focused on the dog's perception or [response] to the human participant or the intervention experience" (p. 2). They continue to state that how the dog (or animal) perceives and response to the participant is crucial to AAI design and effectiveness (p. 2). As much as pet owners would like to say they know how their animals feel, it is not possible to check in and see how an animal feels about their role in AAI and the effect it has on their quality of life. Hediger et al. (2019) comments on how the AAI's ethics should include the perspective of the animal's health and well-being as to avoid suffering from both ends, human and animal (p. 2). Hediger et al. (2019) also states that further research should be done to determine if there are any negative effects of long-term participation in AAI on an animal's quality of life (p. 3).

Similarly to humans, animals can be unpredictable at times. We cannot always predict how animals are going to respond to specific adult participants, child participants and those with disabilities (Wanser et al., 2020, p. 2). It is important to consider all the ways to keep participants and animals safe during any form of AAI. The literature is consistent in the requirement of

certified and trained handlers and animals. While working within the educational setting it is important that teachers, students, and the handler are all properly informed of the correct interactions and behaviour expectations (Sandt, 2019, p. 106). To keep the therapy animal safety, it is important to learn how to interact with the animal appropriately and for the handler to know the signs of stress and anxiety in the animal (Friesen, 2010, p. 263). The signs of stress in an animal may be shaking, ears pulled back, tail between their legs, persistent licking (Friesen, 2010, p. 263).

It is not a surprise that when animals are working inside there will be concerns regarding sanitation. Jalongo et al. (2004) explains that participants of AAI pre-and post-wash prior to physical contact with the animal (p. 11). Therapy animals involved in AAI are expected to keep up with grooming and bathing to limit allergic reactions (Friesen, 2010, p. 262). It is also not uncommon for animals to vomit, urinate or defecate which raises concern for the cleanliness of the environment, but proper bathroom breaks, and vet visits assist in lowering the chances of these incidents from occurring during sessions (Beck, 2015, p. 14-5). In some cultures, animals are perceived as unclean, in these situations it is important to thoroughly talk to the parents and encourage them to allow the interaction that their child seeks with the animal as children are naturally curious about animals and may not have formed cultural concerns towards animals yet (Grove et al., 2021, p. 11).

When working with animals there are always going to be risks, but if one is informed, educated and trained, the likelihood of those risks are decreased. By being aware of the animal's needs and wellbeing, program leaders and handlers can ensure the animal is being taken care of properly. With regular vet visits the animal's health can be closely monitored allowing concerns around potential animal diseases to be decreased as well.

Conclusion

This chapter has explored and defined what generally factors into the creation of an optimal learning environment. The optimal learning environment is one where students feel like they belong, feel safe to learn and make mistakes, and one that removes barriers from their learning. By providing students with safe and comfortable learning environment students are able to focus on their academics and not worry about their abilities. By providing an environment that fosters relationships and connectedness students do not develop feelings of isolation and loneliness.

This chapter also explored the three main areas of Animal-Assisted Interventions (AAI). AAI being the umbrella term that encompasses Animal-Assisted Therapy (AAT), Animal-Assisted Activity (AAA), and Animal-Assisted Education (AAE). A further discussion focused on the psychological, physiological, and social benefits of AAI in various settings. This chapters ended with an overview of the risks and concerns of AAI. These risks are around the safety of the participants and animals, and the health and the sanitation concerns of having animals indoors.

The next chapter will present the results of the study as well as a thorough discussion of the themes found within the literature.

CHAPTER FOUR: RESULTS AND DISCUSSION

Derived from a meta-synthesis of the literature, this study was conducted to determine the benefits of Animal-Assisted Interventions (AAI) on creating/supporting an optimal learning environment in the classroom. To achieve the main goal of the study, the following supporting aims of the study were outlined (see Chapter One, p.14, for full discussion): a) to define the optimal learning environment; b) to gather data on the types of Animal-Assisted Interventions (AAI); and c) to outline how AAI benefits the optimal learning environment. The first supporting aim of the study looked at factors that contribute to an optimal learning.

The second aim of this study was to gather data on the types of Animal-Assisted Interventions (AAI) which was discussed by further demarcating AAI into Animal-Assisted Therapy (AAT), Animal-Assisted Activities (AAA) and Animal-Assisted Education (AAE). The data collected from current literature on these forms of AAI were then used to for the third and fourth aim of this study. The third aim was to gather data on the benefits of AAI for children and the fourth aim was to outline how AAI benefits the optimal learning environment. The second and third aim are represented in Tables 1 and 2 in Appendix A.

The following discussion presents the results of the study organized according to the supporting aims mentioned above and the data analysis discussed in detail in Chapter One (see p. 15). Firstly, the results from the data will be presented – the factors that create an optimal learning environment and the benefits of Animal-Assisted Interventions (AAI). Then, the themes from the literature will be discussed. The three tables will also be discussed and analyzed as discussed in Chapter Two.

Results

This literature review analyzed 76 articles. Out of those articles 37 were studies and 39 were papers, editorials, articles, and dissertations. Table 1 (see Appendix A, p. 71) represents the papers analyzed providing information of the form of Animal-Assisted Interventions (AAI), the setting, the animal uses and the key findings. Table 2 (Appendix A, p. 73) represents the studies that were analyzed providing information regarding form of AAI, the setting, the animals, the participants, design, duration, key terms, and outcomes. Both tables were then compiled into Table 3 (Appendix A, p. 81) to determine how the articles align with the themes found within the literature.

Out of the 39 articles, 11 of them included tables referencing and examining previous literature, 19 included dogs which is not a surprise given Shen et al. (2018) statement regarding dogs to be most common animal used in AAI (p. 205). 11 studies mentioned animals other than dogs, including: horses, dolphins, cats and birds (Busch et al., 2016, p. 319). Some studies included rabbits, guinea pigs and various farm animals (Hoagwood et al., 2017, p. 8). Only two articles mentioned the use of horses as therapy animals and seven did not specify or focus on any particular animal. Out of the 39 articles 19 are in the therapy setting, 18 are in the educational setting, one mentions both environments and one does not specify. Out of the 19 articles that are in a therapy setting, four are AAA, 12 are AAT, and the remaining three articles refer to forms of AAI that are either not well known or labelled incorrectly, these are Animal-Assisted Counselling (AAC), Animal-Assisted Therapy-Counselling (AAT-C), and Animal-Assisted Psychotherapy (APP). Of the 39 articles 18 were in an educational setting, of those articles eight mentioned AAT, eight mentioned AAA, two mention AAE, one mentions a term that was not

found in other articles, Animal-Assisted Literacy, four articles mention reading programs not under AAI and one mentioned the use of Therapy Dogs without a form of AAI.

Out of the 37 studies 24 took place in an education setting, five took place in a therapy setting, one on a farm, in a hospital, and in the family home. 30 out of 37 studies took place in an educational setting, of those studies there were four on AAA, 13 on AAT, two on AAI, five on AAE, two on Canine-Assisted Reading, one on Dog Assisted Literacy, and one on Therapy Dogs. One study did not mention a form of AAI but mentions reading programs, two studies are on AAT in a therapeutic setting, one is on AAI and a farm, one study mentions Canine-Assisted Therapy, there was one study on AAA in the hospital, and one on pets as a form of therapy.

Out of the 37 studies nine were qualitative, 11 were quantitative, four were mixed methods, and six were case studies. 23 studies focus on elementary aged children, four on secondary students, four on post-secondary students, four on elementary and secondary students combined, one on teachers and one on preschoolers and early childhood education. 13 studies comment on academic ability, 15 on increased motivation, 16 on emotions, 12 on behaviour, eight on feeling safe, 12 on calming and stress reducing and 16 on the sense of belonging and feeling connected. Out of 37 studies only two did not find significant results and had too many limitations within the study.

Discussion of Themes

In Chapter Three, the optimal learning environment is described as a community that is positive, comforting, student-focused and provides a sense of safety and belonging. This environment is engaging, supports not only academics but also socio-emotional development. When looking at the 76 articles, 50 comment on increased engagement or motivation, 56 on increased mood and emotions, 46 on behaviour, 44 mention depression, 46 mention anxiety, 53

on stress reduction, 56 on feelings of safety, 61 on academics and 68 on social interaction and

feelings of being connected. The themes that arose from the literature are motivation, emotional

and behavioural regulation, connectedness, sense of safety, and academics

Increased levels of Motivation

In Chapter Three, the optimal learning environment is described as one that is student

centred to increase motivation and engagement in learning. 50 out of 76 articles mentioned

motivation, increased engagement, and positive attitudes towards school and attendance through

various forms of AAI. Motivation is a driving force behind students' learning. If students are not

motivated or interested in learning, they are not going to be engage in learning which can lead to

a disruptive learning environment. When students are motivated, willing, and wanting to learn,

then they are going to be active participants in their own learning.

Kirnan et al. (2020) claim that AAI has a positive impact on students and increases their

motivation (p. 200). Animals, particularly dogs in AAI can bond with students providing them

with friendship and are viewed as non-judgemental partners. This bond motivates children not

only to come to school but to take steps in their learning as they do not feel judged by their

animal partner. These animals are referred to as a "motivating force" and a catalyst to help

students engage in academics and physical activities at school (Beck, 2015, p. 9).

Dogs in the classroom provide a calm atmosphere that is adamant in the optimal learning

environment which can improve the class climate and motivation of students (Beetz, 2013, p. 2).

By having a dog, or other AAI animal, studies found an increase in concentration, and

motivation (Beetz, 2013, p. 2; Hall et al., 2016, p. 2; Henderson et al., 2020, p. 6). This is

reinforced by Busch et al. (2016), who note that AAI encourages both interest and motivation in

students with disabilities (p. 314). Reading programs also found that the dogs were a source of

motivation and helped students develop an interest in reading. Having an animal present

provided students with a source of motivation and encouraged them participate and to stay on

task.

Animals were also found to motivate students to practice boundaries and strengthen their

own coping skills (Flynn et al., 2020, p. 636). Motivation is a key factor in students' willingness

to learn, but motivation also encourages students to self-regulate, calm down, increase mood, and

regulate their behaviours. This leads us into the second theme found within the literature,

emotional and behavioural regulation.

Improvement in Emotional and Behavioural Regulation

An optimal learning environment as mentioned in Chapter Three is one that is

developmentally and socially appropriate. An optimal learning environment adjusts to the needs

of the students' academic-, but also their socio-emotional needs. Emotional and behavioural

regulation is an important factor when considering the learning environment. If a child is always

dysregulated in the learning environment and has negative moods and attitudes towards learning,

then the environment may not be meeting the needs of those students. 46 articles out of 76

comments on student behavior, 44 comment on depression, 46 mention anxiety, and 53 comment

on stress, all of which contribute to behavioral and emotional needs. Often in classes teachers

will use reward systems and positive reinforcement tools to assist and manage student behaviour,

Beck (2015) claims that dogs in AAI can be a part of that reward system through motivation and

modeling (p. 11).

Throughout the literature AAI has been shown to assist with emotional and behavioural

regulation in neurotypical students, as well as those with emotional and behavioural disorders.

Through the perceived unconditional love and acceptance of animals, students can bond with

animals and feel safe in their presence. This bond and sense of safety allows for students to relax

and not focus on the negatives. Animals in AAI, particularly dogs, have been found to reduce

depression, anxiety, aggression, and stress while increasing sense of self, self-esteem,

motivation, positive attitude, socialization, and positive moods. 46 articles comment on positive

behaviour changes which suggests that AAI assists in calming students. Through AAI students

also learn how to behave with the animal. They learn how to move in ways that does not scare

the animal, they learn how to take care of it and how to interact with it safely. Learning how to

behave with the animals assists them in learning how to behave with each other and limiting

negative behaviours between students. Multiple studies also comment on improved ways of

regulating aggression, by teaching patience and following directions (Boe, 2008, p. 30).

  Animals act as a social lubricant and emotional support for students. Beck (2015) found

that animals, particularly dogs, can provide opportunities for students to learn about emotions

and how to cope with them in a healthy and safe manner (p. 12). Providing students with animals

also gives them an opportunity how to express receiving and giving love in a safe environment

(Beetz, 2013, p. 1). Furthermore, animals provide students with an opportunity to learn

responsibility, empathy, coping skills, de-escalation strategies, and respect. Levinson (1997)

mentions that animals act as a mirror, as students are able to project their emotions and

experiences onto the animal (p. 147). This is reinforced by Chandler (2001), who found that

animals in AAI can initiate the emotional sharing process - as the child shares with the animal,

the child is simultaneously sharing with the others in the environment (para. 6).

  Animals furthermore contribute to a safe environment that allows for vulnerability and

emotions to be processed. Along with emotional regulation, studies found increase in mood

towards school as well. The increase in mood is not limited to the students but includes the

teacher which effects the class environment as well, a calm and regulated teacher is a functioning teacher. By increasing the mental health and wellbeing of students, the students can focus on their learning rather than all their worries that live under the surface preventing them to be mentally present in class.

Along with improving behaviours and emotions within the classroom, animals allow for students to feel connected. Animals through AAI act as a social lubricant or social catalyst which allow for students to bond not just with the animal, but with the handlers, teachers, and classmates.

Creating Belonging and Connectedness

The third theme found within the literature is connectedness. Connectedness is the sense of belonging and community that we all long for. Fedor (2018) refers to Maslow's hierarchy of needs and how AAI provides the feeling of connectedness in the school environment which positively influences students' emotional wellbeing and academic success (p. 355). The optimal learning environment in Chapter Three stresses the importance of community. The learning environment needs to be a place where students feel that they belong and have a relationship or connection to the teacher and their peers. Animal-Assisted Therapy allows for the therapeutic alliance to form, where the client forms a bond with the animal and then a bond with the therapist when they feel safe and comfortable. This concept applies to AAI in the classroom as well. The students develop meaningful bonds with the animal and then form bonds with each other.

Relationships formed with the animals improve social and emotional development which enhances their social competence, emotional regulation, and empathy (Scandurra et al., 2021, p. 1512). AAI has been shown to assist with cooperation and social functioning amongst students.

By learning how to treat the animal, students learn how to treat their peers. Also, studies found that having AAI animals in the class allowed for new friendships to form (Barnhart et al., 2020, p. 9; Binfet & Passmore, 2016, p. 449; Beasley, 2013, p. 10; Fedor, 2018, p.356; Beck, 2015, p. 13; Beetz, 2017, p. 140; Boe, 2008, p. 27). Students who did not normally socialize now had a common denominator and a topic to discuss with each other. Together the students can interact with the animal as a social lubricant or buffer, teach each other about the animal, or how to command the animal to perform tricks. AAI provides a unique environment that fosters relationships for those who normally struggle with socialization.

By providing students with the space where they feel as if they belong and feel connected to their peers allows for them not only enjoy coming to school but also enjoy learning with their peers (Beasley, 2013, p. 10; Beetz, 2013, p. 2). It changes the environment from one they have to go to, to one they want to go to because they get to see their friends, feel like they belong and feel safe.

A Safe Place

The fourth theme found within the literature is safety. Not all students that come into our classrooms have a safe home or a history where they have felt safe. By creating an environment where they feel safe, they are able to feel comfortable and focus on their learning and not their survival. In AAT, animals are used as a buffer between the client and the therapist. The client is able to bond with the animal, watch how the animal interacts with the therapist and through the animal they learn how to trust the therapist and form a therapeutic alliance. As educators, it is important to provide students with an environment where they are able to build that trust with the teacher and the classmates. Beck (2015) comments on how learning how to trust the animal sparks hope for students to eventually trust the others in the class (p. 11).

AAI provides a calm environment for students which allows them to feel safe. By reducing stress and fostering relationships, AAI is able to provide a safe environment where students feel that they can not only participate in their learning, but they take risks in their learning knowing that they are not being judged by the animal.

Improved Academic Performance

The last theme within the literature is academics. An optimal learning environment does not necessarily focus on the academics, rather the needs of the students which may not always be the academics. That being said, academics is still an important factor in the learning environment as the goal is still to provide students with the best learning environment possible for the students to learn and succeed. AAI has shown to calm students, decrease anxiety, stress and off-task behaviour while increasing motivation, engagement, and responsibility (Beetz, 2013, p. 3). These benefits have a positive impact on student academics because they are providing students with the best mental space for learning.

Studies on reading programs found that reading to animals was less anxiety inducing and students did not feel judged while coming across new words, taking their time or making connections (Bassette & Taber-Doughty, 2013, p. 241). Studies on these programs found significant reading skill improvements, up to two grades in some cases. Students reading to animals started using expression in their voice because they felt the animals enjoyed the expression and storytelling. Students also engaged in discussions about the books with the dogs which further developed their reading and comprehensions abilities. In this situation students become the teachers and the animal assumes the role of student and/or younger sibling. This allows for students to confidently demonstrate their learning and feel empowered.

Overall, by incorporating AAI into the classroom the environment changes. The animal's presence acts as a social lubricant (Binfet & Passmore, 2016, p. 449). The animal provides students with a companion that is nonjudgmental allowing them to feel safe and free to make mistakes. The animal allows students to communicate and bond over a common interest assisting with friendship development. AAI has also been proven to increase motivation and attitude towards school and learning which increases performance and academics. AAI is also calming which assists with both mood, stress, emotional regulation, and behavioural regulation. AAI has many uses and benefits within the classroom, and it positively impacts the optimal learning environment.

Conclusion

This chapter discussed the results of the study. The first section presented the results of the meta-analysis. First the optimal learning environment was summarized. Next, a discussion of the articles and studies included in the literature review. First the data on Table 1 (Appendix A, p. 71) is discussed analyzing the articles written about Animal-Assisted Interventions (AAI), their environments, animals, what they included and key findings. Next the data on Table 2 (Appendix A, p. 73) was discussed analyzing studies, their environment, participants, and findings. Finally, the five key themes within the literature were discussed. The five themes are motivation, emotional and behavioral regulation, connectedness, safety, and academics. The next chapter will present the conclusion and recommendations of the study.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

Summary of Project

Animal-Assisted Interventions (AAI) have been on the rise since their finding in 1962 and continually gaining more prominence. AAI is growing more popular in various domains including education, therapy, and hospitals. This study set out to determine what possible benefits AAI can have on students in the learning environment. The primary purpose of this study was to present a composition of Animal-Assisted Interventions (AAI) derived from a meta-synthesis of the literature to assist educators in creating the optimal learning environment.

Within a constructivism framework and applying a qualitative meta-synthesis as the research design, a literature review on AAI was conducted (Mertens, 2020, p. 16). Out of 76 articles on AAI, 39 were articles and 37 were studies. Only two studies within the 76 did not find substantial results, the others all finding their results supported previous research that AAI increases motivation, engagement, participation, attitude, mood, attention, concentration, and socialization. It was consistent throughout the literature that AAI decreases anxiety, depression, stress, aggression, emotions, behaviour, violence, and isolation. The literature produced five themes related to increases in: motivation, emotional and behavioural regulation, connectedness, safety, and academic performance.

In summary, this study provided information on the uses, regulations, and benefits of Animal-Assisted Interventions (AAI). The main forms of AAI that were explored are Animal-Assisted Therapy (AAT), Animal-Assisted Activities (AAA), and Animal-Assisted Education (AAE). The benefits and findings from exploring AAI, AAT, AAA and AAE were then examined, and themes were extracted. Those themes were then discussed with their contribution to the optimal learning environment.

Remaining Questions and Issues

Some of the limitations in this study are previously mentioned in Chapter One (page 15). One of the main issues highlighted in this study was the lack of consistency with terminology related to animals used in educative settings for varying interventions and supports. Throughout the literature various studies use the terms Animal-Assisted Therapy (AAT) and Animal-Assisted Activity (AAA) where AAE should be used, leading to inaccurate information for AAT and AAA. The misuse of terminology leads to inaccurate studies, results, and report in the literature. The goals and intent of AAT, AAA and AAE are all different which changes the validity and reliability of studies.

Along with terminology, the research methods within the studies are also not consistent and often lack control groups. A few studies comment on the need for AAI to be manualized for consistency in terminology and study. This would provide organizations, handlers and professionals with the requirements and guidelines of AAI and the different types of AAI while providing researchers with more guidance for future studies. Future research should be done on the authenticity of AAI programs available due to this lack of consistency. Future research could also involve more opportunities for control groups to provide more reliable results.

Lastly, this study is only a literature review, future research on AAI in the classroom would provide a better vision of the benefits to the optimal learning environment. A study in an educational environment that allows for a control group would provide more reliable and generalizable data.

Implementation Benefit

By implementing Animal-Assisted Interventions (AAI) in the classroom setting, a teacher is able to bring in a living creature, to interact with students and allow them to communicate

through various non-verbal ways. By learning how to interact with the animal safely, students develop in their behaviour towards one another. In learning how to take care of an animal students learn responsibility and caring behaviours. AAI also allows for community and relationships to form that might not always be possible for those who struggle with socialization. Working with an animal also provides a non-judgemental partner who is patient, listens, and provides comfort. Bonding with the AAI animal helps students feel fewer stress-, anxiety- and depression-related symptoms, thereby motivating them to come to school and participate in learning activities and socialization. AAI contributes to the optimal learning environment by providing a calming atmosphere that fosters belonging and engagement. It also provides a sense of safety where students can feel at ease and focus on their learning and not on their anxieties.

Due to the inconsistent terminology, it is difficult to find AAE programs available in Canada, let alone British Columbia. It is easier to search for AAT or AAA or "dog reading programs" which provides significantly more results than AAE. That being said, some programs in Canada are: "Therapeutic Paws of Canada" (TPOC), Reading Education Assistance Dog (R.E.A.D), Pacific Animal Therapy Society (PATS), "Pets and Friends" and The Vancouver EcoVillage Society. "Therapeutic Paws of Canada" (TPOC) offers reading programs and a "PAWS Rooms" where schools can have TPOC volunteers visit the school, but they do not require certified animals. Reading Education Assistance Dog (R.E.A.D) is an AAT program founded in America and the studies examined for this study mention R.E.A.D frequently in the studies examined for this study and is available in Ottawa, Ontario. Another AAT program is Pacific Animal Therapy Society (PATS) which is located in Victoria, BC. PATS offers de-stress programs where therapy dog teams visit schools, and they offer Paws and Tales a literacy program. A local organization "Pets and Friends" offers therapy team visits where a handler and

dog visit, although it is unclear if they visit schools. The Vancouver EcoVillage Society offers Animal-Assisted Activities (AAA) with certified therapy dogs. It is important to thoroughly examine the programs and the monitoring of the handlers and animals involved in AAI before inviting them into the classroom.

Recommendations

This study investigated the available research on potential benefits of AAI on the optimal learning environment. This section will offer some recommendations for educators to include AAI opportunities in the classroom to assist with developing an optimal learning environment. Before bringing in an animal into the classroom it is important to research the program you are interested in. Look to see what they are providing, what they are able to do, their certifications, the grooming standards for the animal prior to attending and even meeting the handler and animal prior to entering a partnership.

Before selecting a program determine the goal of AAI in order to determine whether to search for AAT, AAA or AAE. If the options for the form of AAI you are hoping for are limited or it is too difficult to find local organizations, look into other forms of AAI and the programs offered. Due to inconsistent terminology and overlap within the types, you may still find a program that aligns with your goals. Pay attention to their purpose statements, their requirements for both handlers and the animals involved and what the description of the service they are providing. If it sounds like a responsible organization make contact, ask questions and meet the handlers and animal before making a decision.

Prior to implementing an animal into the classroom, it is important that teachers have researched, planned and discussed what the handler and animal will be doing. It is important that they discuss the environment, where the dog with enter and exit, where the dog will be, what can

be done with the dog and what not to do with the dog. It is important that the handler comes to

the classroom prior to starting an AAI program with the students. After planning for AAI to be

incorporated it is important to have both administration's approval and informed parental consent

of each student. Once planning, approval and consent have been completed it is important to

teach the students how to behave with the animal that is going to be attending the classroom

prior to the first day of AAI.

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APPENDIX A

Table 1 Articles on Animal Assisted Intervention

#	First Author	Year	Article Purpose	Animal	Field	Inclusion of Tables	Key Terms
1	Anderson	2007	Opinion	Dogs	Education		Emotional or Behavioral Disorder (EBD), Animal-Assisted Therapy, social skills, social cooperation, problem-solving, calming tool, de-escalation, respect, responsibility, empathy, safety considerations
2	Bachi	2017	Editorial	Dogs, horses	Therapy		Animal-Assisted Psychotherapy (AAP), Human-Animal Bond (HAB), Human-Animal Interactions (HAI), at-risk children and youth, pervasive development disorders, psychiatric patients, way veterans, attachment theory, cognitive therapy, psychodynamic therapy, eye movement desensitization and reprocessing, play therapy, therapeutic alliance, reducing stress, decrease cortisol, anxiety, self-regulation, trauma, efficacy, depression
3	Beetz	2017	Article	Various	Therapy & Education		HAI, AAI, socio-emotional learning, ASD, emotional disorders, physical and sensory abilities, children, adolescents, physiological, cortisol, mood, depression, empathy, pain perception, aggression, concentration, biophilia, social catalysts, anthropomorphism, motivation, special education, fear failure, reading, stress oxytocin, attachment theory, social support theory, distraction, executive functioning
4	Brelsford	2017	Review	Dogs	Education	✓	AAI, AAA, AAT, pain management, depression, psychological functioning, socialization, anxiety, depression, schizophrenia, HAI, oxytocin, cortisol, stress, social buffer, schools, children, adolescents, elderly, terminology, efficacy, increase in mood, motivation, well-being and attention, reading, on-task, EBD, socio-emotional learning, Downs Syndrome, Autism, Oppositional Defiance Disorder (ODD), ADHD, reactive attachment disorder, intermittent explosive disorder, central auditory processing disorder, visual processing, auditory process, concentration, emotional regulation, educational setting, reading ability, emotional stability, social functioning, aggression, motor skills, classroom behavior
5	Busch	2016	Review	Various	Education	✓	AAI, ADHD, terminology, AAT, AAA, biophilia, attachment theory, stress, anxiety, oxytocin, heartrate blood pressure, cortisol, mood, ASD, calming effects, working memory, Cognitive Behavioral Therapy (CBT), decrease in ADHD symptoms, Executive Functioning, self-regulation, social catalyst, teaches: responsibility, values, empathy, perspective, and pro-social behaviors, decrease in aggression and hyperactivity, social-functioning, social rejection, motivation, improved attention and concentration, cognitive functioning, modeling behavior, role of animals as learning facilitators, pets vs. intervention animal
6	Chandler	2001	Editorial	Various	Therapy		AAA, AAT, Animal-Assisted Counseling (AAC) anxiety, motivation, comfort, animal facilitates trust-bonding
7	Fedor	2018	Editorial	Various	Education		AAT, connectedness, social-emotional well-being, academic success, increase confidence, positive attitudes towards reading, community,

						classroom climate, responsibility, engagement, emotional connection, behavior
8	Friesen	2010	Review	Dogs	Education		AAT, AAA, education, risks and concerns, lower behavioral, emotional and verbal distress, emotional stability, positive attitudes towards schools, increased alertness and attention, severe emotional disorders, child as nurturer, children, adolescents and elderly, therapy dog, emotional well-being, non-judgmental, social interaction, social behavior, calming effect, anxiety
9	Friesen	2012	Article	Not specified	Education		Animal-Assisted Literacy, reading programs, empowered, social, emotional and academic growth
10	Fung	2016	Review	Dogs	Education		AAI, AAE, Canine-Assisted reading programs, reading skills, reading fluency, attitudes towards reading, non-judgmental, mutism, giftedness, attention, emotions, ASD, dog as younger sibling, child as teacher, safe warm atmosphere, oral language
11	Geist	2011	Review	Dogs	Therapy		AAI, AAT, attachment theory, cognitive theory, education, emotional support, HAB, reduce stress, nonjudgmental, calming effect, emotional disorders, ADHD, Conduct Disorder (CD), PTSD,
12	Glenk	2017	Review	Dogs	Therapy	✓	AAA, AAI, AAT, social attractiveness, reading programs, pro-social behavior, increased motivation, intrinsic activation, decreased anxiety, sadness, loneliness and increased social functioning, oxytocin, increased quality of life, therapy dog certification, physical touch, heart rate, relaxation, social contact, safety concerns, calming effect
13	Hall	2016	Review	Dogs	Education,	✓	HAI, reading programs, reading anxiety, improved reading ability, confidence, anxiety, attitudes, stress,
14	Hoagwood	2017	Review	Various	Therapy	✓	AAI, AAT, mental health, biophilia, attachment, HAI, stress, emotional and behavioral problems, at-risk children and youth, ASD, ADHD, social functioning, trauma, PTSD,
15	Jalongo	2012	Article	Dogs	Education		Reading programs, self-esteem, calming effect, reduce stress, attention difficulties, reading abilities, therapy animals, educational setting
16	Jalongo	2015	Review	Dogs	Education		HAI, AAA, attachment theory, pets, biophilia, social skills, attention, on-task behavior, reading abilities, relationships, connections, education
17	Jalongo	2004	Review	Dogs	Education		AAA, AAT, therapy dogs, reduce stress, blood pressure, heart rate, anxiety, reading programs, calming effect, inclusion, certification, animal-assisted learning activities, educational setting, safety, and sanitation concerns, HAB
18	Joseph	2016	Article	Various	Therapy		AAT, AAA, Cerebral Palsy (CP), Hippo Therapy, Dolphin Assisted Therapy, Canine/Dog Assisted Therapy, motor function, companionship, rapport between therapist and client, attention, sociability, speech, behavior, muscle tone

19	Kazdin	2011	Chapter	Not specified	Therapy		AAT, friendship, mental health, psychotherapy, self-esteem, responsibility, loneliness, social support, bonding, reduce animal cruelty, reduced aggression and anxiety, academic performance, codification, manualization
20	Komorosky	2015	Article	Not specified	Therapy		AAT, empathy, prosocial behavior, children and adolescents, cognitive, aggressions, humane education, responsibility, compassion, nonjudgmental, animal-assisted school-based violence prevention, restorative justice, community, animal shelter, animal welfare, detained juveniles, social skills, communication, patience, honesty, critical thinking, ability to trust
21	Knowles	2021	Discussion	Not specified	Education		AAA, EBD, depression, anxiety, social skills, academic performance, release neurochemicals, stress, blood pressure, therapeutic and educational setting, intellectual or developmental disability, ASD, decrease in problem behaviors, reading skills, weak methodologies, sanitary and safety concerns, model appropriate behaviors,
22	Kropp	2019	Review	Dogs	Education	✓	AAI, AAA, AAE, AAT, certified therapy dog, emotional support dog, facility dog, reading programs, reading skills, nonjudgmental, stress, motivation, safe learning environment, positive social and emotional skills
23	Kruger	2006	Chapter	Various	Therapy		AAI, AAT, AAA, terminology, Hippo Therapy, animal welfare, service animal, guide dog, biophilia, learning theory, social catalyst, relaxed, attachment theory, alleviating stress, emotional bond, cognitive and social theories, self-efficacy
24	Levinson	1997	Book	Dog	Therapy		Father of Pet Therapy, AAT, co-therapist, "disturbed" children, ASD, trust transfer, pet is a mirror, social lubricant
25	Melson	2011	Chapter	Not specified	Therapy		AAA, AAT, HAI, biophilia, cognitive development, friendship, AAE, attachment theory, language development, moral development, pets as family, stress, emotional distress, social catalyst,
26	Menna	2019	Concept Paper	Various	Various		AAI, AAA, AAE, AAT, Alzheimer's, ASD, Parkinson's, biopsychosocial approach, biophilia, relationships, animal welfare, attachment bonds, emotional resonance, sense of security, neutralize stress
27	Morrison	2007	Review	Various	Therapy		AAI, AAT, AAA, terminology, heart rate, blood pressure, well-being, loneliness, self-care, depression, communication, reduced physical and emotional pain, safety concerns, certification
28	Nakajima	2017	Comparison	Various	Education	✓	AAE, Japan Animal-Rearing Education, social skills, cognitive ability, reading programs, reading ability, social behavior, socioemotional competence, empathy, classroom environment, motivation, discipline, relaced, task completion, performance, motivated, attachment, empathy, aggression, attitude towards school, emotions, attention, cognitive tasks
29	Nimer	2007	Meta-Analysis	Dogs	Therapy	✓	AAT, ASD, medical conditions, emotional difficulties, compromise mental functioning, undesirable behaviors, physical problems, children, adolescents, adults, elderly, well-being, happiness,

30	O'Haire	2013	Review	Not Specified	Therapy	✓	AAI, Alzheimer's, CD, ADHD, HAI, positive social engagement, ASD, terminology, problem behavior, stress, well-being
31	O'Haire	2015	Review	Various	Therapy	✓	AAI, AAT, AAA, HAI, trauma, abuse, anxiety, fear, emotional well-being, dementia, depression, terminology, service dog, therapy dog, PTSD, dissociation, social, emotional, nightmares, blood pressure, animal welfare
32	Pillow-Price	2014	Editorial	Dogs	Education		Reading programs, social lubricant, reading fluency, nonjudgmental, self-esteem
33	Sandt	2019	Article	Dogs	Education		AAE, AAI, ADHD, ASD, reading programs, HAI, decreased cortisol, empathy, anxiety, mood, reading, certified dog, service dogs, therapy dogs
34	Santaniello	2020	Review	Dogs, Horses	Various	✓	Terminology, AAI, AAA, AAT, AAE, AAC
35	Scallion	2010	Article	Dogs	Education		Therapy dogs, AAT, socialization, communication, self-esteem, cooperation, expression, trust, attention, concentration, affection, anxiety, reduce abusive behavior
36	Serpell	2010	Chapter	Not Specified	Therapy		Animism, AAT, social support, social network, companion, stress-reducing, de-arousing, loneliness, cared for
37	Shaw	2013		Dogs	Education		Reading programs, AAT, safe place, enjoyment, confidence, reading abilities
38	Shelton	2011	Paper	Not Specified	Therapy		AAT, psychotherapy, Animal Assisted Therapy in Counselling (AAT-C), therapeutic alliances, nonjudgmental, bridge the gap, pet vs. therapy animal, safety and sanitary concerns
39	Shen	2018	Review	Various	Therapy		AAI, AAE, AAA, AAT, HAB, life satisfaction, coping abilities, calmness, interpersonal sensitivity, stress reduction, emotional well-being, behavior, terminology, self-esteem, physical contact, distraction, concentration

Table 2 Studies on Animal-Assisted Interventions

#	First Author	Year	AAI	Animal	Setting	Method	Participants	Sessions			Findings	Key Terms
								Duration	Frequency	Length		
1	Anderson	2006	X	Dog	Education	Case Study	6 children 6 – 11 years	NA	Daily	30 min.	Emotional stability, improved students' attitudes towards school, responsibility, respect and empathy	Love, acceptance, non-judgmental, connectedness, EBD, stabilize, de-escalating, sense of self, control, positive relationships, respect, empathy, feelings parallel, ODD, Explosive disorder, ASD, ADHD
2	Barnhart	2020	AAI	Alpacas, cats, chickens, cows, dogs, donkey, ducks, geese, goats, guinea pigs, horses, pigs, rabbits, sheep & turkeys	Farm	Qualitative	9				- Different animals provided different benefits	Autism, self-esteem, companionship, empathy, comfort, friendship, acceptance
3	Bassette	2013	AAA	Dog	Special Education Class	Single Case Study	3 Student 1 – 7 Female Student 2 – 11 Male Student 3 – 11 Male	4 weeks	1 – 2 days a week	30-90 min.	- increased on-task behaviors, improvements in behavior, reading skills, enjoyed reading to dogs, engaged in reading, influenced level of motivation	Emotional and behavioral disabilities (EBD), Reading programs, Language Impairment, Learning disability

4	Beasley	2013	AAT	Dog	Family Home	Mixed methods	2 families – 6 children 5 – 11 years	NA	4 sessions	30 minutes	- promoted communication, comfortable, reduction in stress, motivated to read, engaged, concentration	Social skills, communication, problem behaviors,
5	Beck	2015	AAT & AAA *Canine-Assisted Therapy*	Dog	School	Qualitative - Survey	~80 teachers or staff - only 8 responses				calming and motivating environment, felt comfortable and welcomed	Calm, motivation, safety, behavior, social lubricant
6	Beetz	2013	AAE	Dog	School	Quantitative	46 students 8 – 9 years	School year	1 day a week	NA	No significant improvements in depression but evident improvement in attitudes towards school and learning, positive effect on emotional regulation,	Companion animal, stress reduction, school-related tasks, attachment, biophilia, depression, self-esteem, behavior, emotional regulation, social climate, social interaction, executive functioning,
7	Binfet	2016	AAT	Dog	University	Mixed Methods	12 handlers, 86 university students	8 weeks	Weekly	45 min.	Reduction in homesickness, increase satisfaction, increase emotions and attitude towards campus life, new friendships	Homesickness, isolation, & emotional, physical and cognitive functioning
8	Boe	2008	AAT	Dogs	School	Quantitative	Single Subject 18-year-old male with EBD (Collected data on an additional student for comparison)	20 days over 4 weeks	Daily	NA	Self-esteem improved, off-tsk behavior decreased, impolite behavior decreases, noncompliance decreased	Emotional and behavioral disorders (EBD), emotional support, stress reduction, decrease depression, anxiety, blood pressure, increase in self-esteem, acceptance, nonjudgmental, socialization,

												problem-solving skills
9	Booten	2011	AAT	Dog	School	Quantitative	17 5th grade students Control group – 15 students	Two 9-week sessions	3 days	All day	No significant effect on behavior or reading in the classroom	Reading programs
10	Boyer	2014	AAT	Cat	School but in therapy room	Single Subject Design	3 participants 4, 7 and 8 years old	9 weeks	weekly	15 minutes	Improvements in verbal and social communication	Language impairments
11	Charles	2018	Pets As Therapy	Dog	Library	NA	University students	NA	NA	10-15 minutes	Allowed for social interaction, express their emotions, calming,	Reduce stress, emotional support, calm, friendly
12	Computis	2019	AAT	Dog	Therapy	Case Study	16-year-old female	NA	Weekly	NA	Sleep improvements, more positive relationships, positive attitude and engagement in therapy	AAT, mindfulness, emotional regulation, motivation, empathy, sense of safety, animal welfare, attachment theory, build rapport, psychotherapy
13	Dell	2015	AAT AAA	Dog	University	Qualitative	726 students across 3 universities Only 403 completed surveys				Stress reduction, improved mood, relaxation, calming	AAA, AAI, HAB, reduce anxiety, social support, responsibility, self-perception, belonging, companion, nonjudgmental, biophilia, emotional bond,
14	Dice	2017	AAE	Dog Donkey	School	Quantitative	21 students, median age = 8		6 sessions		Too many limitations	EBD, AAE, stress, anxiety, mood, loneliness, depression, emotional catalysts

15	Dietz	2012	AAT	Dogs	Group Therapy	Quantitative	153 students with CSA 7 – 17 years	12 weeks	Weekly	NA	Positive impact, unconditional acceptance, significant differences in depression, anger, PTSD, and dissociation	PTSD, trauma, child sexual abuse (CSA), Oppositional Defiance Disorder, insecure attachment, AAT, attention
16	Dragani-Reagan	2019	AAT Animal Assisted Literacy	Dogs	School	Descriptive	131 teachers	NA	Weekly	NA	Improved reading comprehension and fluency, improved engagement, decrease avoidant behaviors	Loneliness, isolation, social support, decreased anxiety, increased level of comprehension, decrease in behavior, increase in social support and acceptance, Reading programs
17	Flynn	2020	AAT	Farm animals	School Green Chimney's Campus (Private Special Education School)	Qualitative	23 participants				Sense of importance, responsibility, self-efficacy, competence, feelings of equity, empowered, soothing, comforting, self-regulate around animals, calming, self-awareness, engagement	Dementia, schizophrenia, developmental disabilities, Autism, PTSD, self-regulation, attention problems, depression, anxiety, emotional difficulties, increased engagement, safe space
18	Fung	2019	AAE, AAI, Canine-Assisted	Dog	School Library	Evaluative	15 grade 3 students	4 weeks	Twice a week	20	Positive impact on reading fluency, more relaxed	Improved reading abilities, attitudes towards reading, reading accuracy, reading fluency,
19	Grajfoner	2017	AAA	Dog	University	Mixed Methods	132 participants				Positive influence in well-being, decrease in anxiety, increase in mood,	Mental health, resilience, well-being, Feeling loved, decreased psychological stress,

#	Author	Year	Type	Animal	Setting	Methodology	Sample	Duration	Frequency		Findings	Themes
20	Grove	2021	Therapy Dog Program	Dogs		Qualitative	13 schools				Relationships, sense of belonging, acceptance	Sense of belonging, AAE, AAA, AAT, service dogs, concerns and risks,
21	Henderson	2020	AAA	Dogs	School	Qualitative	6 handlers 11 children 8 teachers 8 parents	12 weeks	Weekly	NA	Sense of importance, increased confidence, increased autonomy, increased pro-social behavior, improved reading and attitudes towards reading, perception of self, improved concentration, increased enjoyment and engagement	Positive environments, increase mood, reading programs, increase reading skills and attitudes towards reading,
22	Ichitani	2016	AAA	Dog	Hospital	Qualitative	17 children				Decrease in pain, stopped crying, reduction in heart rate, blood pressure, body temperature, respiration and pupillary constriction, increased relaxation, distraction, reduced depression, increase mood	AAT, AAE, AAA, promotes self-care, depression, loneliness, motivation, anxiety, blood pressure, stress, pain
23	Jurickova	2020	AAE	Dog	School	Case Study	2 students				Improved behavior, reading comprehension, positive impact on social behavior, improved concentration and communication	ADHD, social skills, academic performance, concentration, confidence
24	Kirnan	2015	AAA AAT	Dogs	School Libraries	Mixed Model	Experiment 1: 1 elementary school Experiment 2: 12 teachers				Increase in motivation and confidence, increase in focus and ability to be on task, increased engagement	academic abilities, emotional well-being, stress reduction, anxiety, loneliness, reading programs, AAT, AAA
25	Kirnan	2020	AAI	Dog	School	Single Case Study	Experiment 1: Special education classroom	1 Year	NA	NA	Reluctant readers were more willing to read, improved behavior, increased on-task	Special education, learning theory, AAI, AAT, AAA, AAE, reading, social

#	Author	Year	Type	Animal	Setting	Methodology	Sample	Duration	Frequency	Length	Findings	Keywords
							Experiment 2: 12 teachers				behavior, calming effect, sociability with peers, unconditional friendship, confidence, self-esteem, reduction in negative behaviors,	benefits, social lubricants, unconditional love and support, behavioral improvements
26	Kirnan	2018	Dog-assisted literacy	Dog	School	Quasi-experimental	1 elementary school	3 years	NA	1 hour – 10 to 15 minutes with dog	Positive impact on reading	Reading, AAE, dog-assisted literacy, decrease stress, anxiety and loneliness, fun, non-threatening, lack of rigor, R.E.A.D, C.A.R.E.
27	Levinson	2017	Therapy Dogs	Dog	School	Quantitative	45 students Grades 2 - 5	10 weeks	Twice a week	15 minutes	Increased in oral fluency, better results in younger grades,	Reading programs, increase motivation and interest, nonjudgmental, improved attention, reduced stress,
28	Linder	2018	Canine-Assisted reading	Dog	School	Quantitative	28 Grade 2 students	6 weeks	Weekly	1 hour	Improve attitudes towards academic reading	Motivation, low self-esteem, self-efficacy, stress reduction, human-animal bond, reading,
29	Lubbe	2013	AAT	Dog	Therapy	Case Study Qualitative	1 14-year-old male	1.5 years	NA	NA	Dog facilitated relationship between client and therapist, motivational tool for therapy, unconditionally accepting and non-judgemental, relaxed, cooperative, co-therapist, communication, developed coping mechanisms, physical touch, self-esteem, responsibility, empowered, sense of belonging and love.	Facilitate relationship between child and therapist, trust transfer, unconditionally accepting, confidante, communication, storytelling, self-worth, self-acceptance and trust

30	Motarabeso un	2016	AAT	Dogs	Therapy	Experimental	2	NA	6 sessions	45 minutes	Enhanced social skills, self-efficacy, self-esteem and emotional and cognitive conditions, sense of responsibility, concentration	ADHD, play therapy, AAT, psychotherapy, self-esteem
31	O'Haire	2013	AAA	Guinea pigs	School	Quantitative	128 Grades K-7	8 weeks	Twice a week	20 minutes	Improved social functioning, social skills, decrease problem behaviors, increased engagement, increase social cohesion, enhance socio-emotional development, social lubricants	HAI, socio-emotional development, attachment theory, reduce problem behaviors, biophilia, increased cognitive tasks, social lubricants
32	le Roux	2014	AAT	Dog	School	Mixed Methods	106 students Grade 3	10 weeks	NA	NA	No significant results but there was higher reading rate, accuracy and comprehension in the dog group, did dog listened and unconditionally accepted them	Animal-Assisted reading programs, AAA, AAT, learning disabilities, socialization skills, Autism, Fetal Alcohol Syndrome, attention, motivation, reduce stress and anxiety, self-esteem,
33	Scandurra	2021	AAE	Dog	School	Quantitative	104 children Grade 2	10 months	Bi-monthly	1 hour	Improved EC, increased social cohesion, decreased aggression, increased cognitive tasks, positive impact on social and emotion development,	Emotion comprehension, HAI, AAIs, prosocial behavior, task performance, reduced stressed, decreased aggression, Autism, ADHD, EBD
34	Schuck	2018	AAI	Dog	Education	Quantitative	88 children 7 – 9 years	12 weeks	Twice a week	4.5 hours a week	Significant improvement in ADHD symptoms, social skills, social interaction and problem behaviors	ADHD, executive functioning, AAI, self-esteem, self-perception, ODD

35	Signal	2017	AAT	Dog	Therapy	Quantitative	20 children 5 – 12 years	10 weeks	NA	90 minutes	Reduction in avoidance behavior but not the most effective study, increased mood, kindness and empathy	Child sexual abuse (CSA), helplessness, PTSD, AAT,
36	Sokal	2021	AAA	NA	University		242 students	NA	NA	1.5 hours	Reduced stress, increased self-perceived happiness	Mood, anxiety, AAA, control, stress, well-being
37	Zents	2017	AAT	Dog	School	Qualitative	35 students 6-8th grade & 11- 12th grade

Questionnaires:
196 students, 215 faculty | | | | School climate, nonjudgment and sense of unconditional love, calming effect, social-emotional learning, reading intervention, breaks, improving attendance, increasing responsibility, teaching empathy, reading, improved de-escalation time, improved attendance, breaks resistance barriers to open communication | AAT, social support, psychological support, attachment theory, well-being, anxiety, depression, de-stress, problem solving, empathy, communication, reading, confidence, selective mutism, Autism, attendance, emotional support, behavior |

Table 3 Key Themes

#	First Author	Year	Type of AAI	Setting	Motivation	Emotion	Behavior	Depression	Anxiety	Stress	Safe	Academic	Connectedness
1	Anderson	2007	AAT	Education	✓	✓	✓	✓	✓	✓	✓		✓
2	Anderson	2006	AAT	Education	✓	✓	✓					✓	✓
3	Bachi	2017	AAP	Therapy	✓	✓	✓	✓	✓	✓	✓		✓
4	Barnhart	2020	AAI	Therapy					✓	✓	✓		✓
5	Bassette	2013	AAA	Education	✓	✓	✓		✓	✓		✓	✓
6	Beasley	2013	AAT	Education	✓	✓	✓		✓	✓	✓	✓	
7	Beck	2015	AAT, AAA, Canine Assisted Literacy	Education	✓	✓	✓	✓	✓	✓	✓	✓	
8	Beetz	2017	AAI	Therapy & Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
9	Beetz	2013	AAE	Education	✓	✓	✓	✓		✓		✓	
10	Binfet	2016	AAT	Education	✓	✓			✓	✓		✓	✓
11	Boe	2008	AAT	Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Booten	2011	AAT	Education	✓	✓	✓	✓				✓	
13	Boyer	2014	AAT	Education	✓							✓	✓
14	Brelsford	2017	AAA, AAI, AAT	Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Busch	2016	AAI, AAT, AAA	Education	✓	✓	✓	✓	✓	✓	✓		✓
16	Chandler	2001	AAA, AAT, AAC	Therapy	✓				✓	✓	✓		✓
17	Charles	2018	X	Therapy		✓	✓	✓	✓	✓			✓
18	Computis	2019	AAT	Therapy	✓	✓		✓	✓	✓	✓		✓
19	Dell	2015	AAT & AAA	Education		✓		✓	✓	✓	✓		✓
20	Dice	2017	AAE	Education		✓	✓	✓	✓	✓			
21	Dietz	2012	AAT	Therapy		✓	✓	✓	✓	✓	✓		✓
22	Dragani-Reagan	2019	AAT, Animal	Education	✓	✓	✓	✓	✓	✓		✓	✓

#	Author	Year	Type	Setting	1	2	3	4	5	6	7	8	9
			Assisted Literacy										
23	Fedor	2018	AAT	Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
24	Flynn	2020	AAT	Education	✓	✓	✓	✓	✓		✓		✓
25	Friesen	2012	AAT, AAA	Education	✓				✓		✓	✓	✓
26	Friesen	2010	AAL	Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
27	Fung	2019	AAI & AAE	Education	✓							✓	
28	Fung	2016	AAI & AAE	Education	✓	✓			✓	✓	✓	✓	✓
29	Geist	2011	AAI & AAT	Therapy	✓	✓	✓	✓	✓	✓	✓		✓
30	Glenk	2017	AAA, AAI, AAT	Therapy	✓	✓	✓	✓	✓	✓	✓		✓
31	Grajfoner	2017	AAA	Education		✓	✓	✓	✓	✓	✓		✓
32	Grove	2021	Therapy Dogs	Education					✓	✓	✓	✓	✓
33	Hall	2016	X	Education	✓				✓	✓	✓	✓	✓
34	Henderson	2020	AAA	Education	✓	✓	✓		✓	✓	✓	✓	✓
35	Hoagwood	2017	AAA & AAT	Therapy		✓	✓	✓	✓	✓	✓		✓
36	Ichitani	2016	AAA	Hospitals	✓	✓		✓	✓	✓			✓
37	Jalongo	2015	X	Education	✓	✓	✓				✓	✓	✓
38	Jalongo	2012	AAA	Education	✓		✓		✓	✓	✓	✓	✓
39	Jalongo	2004	AAT & AAA	Education					✓	✓	✓	✓	✓
40	Joseph	2016	AAT, AAA	Therapy	✓		✓				✓		✓
41	Jurickova	2020	AAE	Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
42	Kazdin	2011	AAT	Therapy		✓	✓	✓	✓	✓	✓		✓
43	Kirnan	2020	AAI	Education	✓	✓	✓			✓	✓	✓	✓
44	Kirnan	2018	Canine Assisted Literacy	Education	✓	✓				✓	✓	✓	✓
45	Kirnan	2015	AAI	Education	✓	✓	✓	✓	✓	✓	✓	✓	✓
46	Komorosky	2015	AAT	Therapy		✓	✓				✓		✓
47	Knowles	2021	AAA	Education		✓	✓	✓	✓	✓	✓	✓	✓

#	Author	Year	Type	Category									
48	Kropp	2019	AAI, AAA, AAE, AAT	Education	✓	✓			✓	✓	✓	✓	✓
49	Kruger	2006	AAI, AAT, AAA	Therapy						✓	✓		✓
50	Levinson	1997	AAT	Therapy	✓	✓	✓	✓	✓	✓	✓		✓
51	Levinson	2017	Therapy Dogs	Education	✓		✓		✓	✓	✓	✓	✓
52	Linder	2018	Canine Assisted Reading	Education	✓				✓	✓	✓	✓	✓
53	Lubbe	2013	AAT	Therapy	✓						✓		✓
54	Melson	2011	AAI, AAT, AAE	Therapy		✓	✓				✓		✓
55	Menna	2019	AAI, AAA, AAE, AAT	Various		✓				✓	✓		✓
56	Morrison	2007	AAI, AAT, AAA	Therapy									
57	Motarabesoun	2016	AAT	Therapy		✓	✓	✓	✓		✓		✓
58	Nakajima	2017	AAE	Education	✓	✓	✓			✓	✓	✓	✓
59	Nimer	2007	AAT	Therapy		✓	✓						
60	O'Haire	2015	AAI, AAT, AAA,	Therapy		✓			✓	✓	✓	✓	✓
61	O'Haire	2013	AAI	Therapy		✓	✓	✓	✓		✓		✓
62	O'Haire	2013	AAA	Education		✓	✓				✓		✓
63	Pillow-Price	2014	X	Education	✓						✓	✓	✓
64	le Roux	2014	AAT	Education	✓				✓	✓	✓	✓	✓
65	Sandt	2019	AAE & AAI	Education	✓	✓			✓	✓	✓	✓	✓
66	Santaniello	2020	AAI, AAA,	X					✓	✓			

#	Author	Year	Type	Setting										
			AAT, AAE, AAC											
67	Scallion	2010	AAT	Education	✓	✓	✓	✓	✓	✓	✓	✓		✓
68	Scandurra	2021	AAE	Education	✓	✓	✓	✓	✓	✓	✓	✓		✓
69	Schuck	2018	AAI	Education	✓								✓	✓
70	Seprell	2010	AAT	Therapy		✓	✓	✓		✓	✓	✓		✓
71	Shaw	2013	AAT	Education	✓					✓	✓	✓	✓	✓
72	Shelton	2011	AAT, AAT-C									✓		✓
73	Shen	2018	AAI, AAE, AAA, AAT	Therapy	✓	✓	✓				✓	✓		✓
74	Signal	2017	AAT	Therapy		✓		✓	✓		✓			✓
75	Sokal	2021	AAA	Education		✓		✓	✓	✓				✓
76	Zents	2017	AAT	Education	✓	✓	✓	✓	✓	✓	✓	✓		✓