

## Canine-Assisted Therapy and Autism Spectrum Disorder in Secondary Schools: An Integrative Literature Review

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### ABSTRACT

Inclusive education requires equitable and caring learning environments for all students. To achieve this outcome, schools must provide appropriate levels of support and, where necessary, effective, adaptable and inspirational interventions to foster whole-school inclusivity. This Integrative Literature Review investigates the phenomenon of canine-assisted therapy (CAT) as a possible way to assisting schools becoming more inclusive. Recognising the growing interest in CAT as a means of enhancing student well-being, emotional health, and educational experience, the study systematically synthesises a range of diverse methodological research outcomes on this subject. Using thematic analysis, the integration of these research outcomes from 22 peer-reviewed published studies resulted in the identification of six emergent themes. The findings isolate unique qualities and features of CAT when used to engage adolescent cohorts in multiple secondary schools throughout the world. The study presents findings that are consistent with past research by validating, but also extending, CAT as a possible intervention to reduce symptoms of stress and facilitate social interactions and inclusivity. Students impacted by anxiety, and in particular students diagnosed with autism spectrum disorder, may find CAT particularly worthwhile. Results suggest that the unconventional, but increasingly popular, use of CAT may provide an alternative approach to supporting and addressing diverse student needs in complex secondary school environments.

**Keywords:** *Canine-assisted therapy, anxiety, autism spectrum disorder, integrative literature review, secondary school*

Secondary schools in Australia, the general context for this study, have become increasingly diversified due to both changes in the country's demographic profile and overt inclusive education policies of governments. These policies require schools to comply with statutes like the Education (General Provisions) Act 2006 as well as other State and Commonwealth anti-discrimination laws. Schools, as a consequence, must work collaboratively to ensure students can access and participate in every aspect of school life (Queensland Government, 2021).

The laws and policies associated with inclusive education advocate for the rights of students and recognise that each student has a fundamental right to succeed. Inclusive education,

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therefore, aims to provide every student with equal access to, and full participation in, successful learning. However, academic, social, emotional and mental health challenges can create barriers for students and can impede learning (Beames et al., 2022). The need for innovative, effective teaching and learning strategies and programs tailored to meet these diverse needs have become mandatory in Australia's diverse and multicultural education context.

In parallel to issues of inclusivity are challenges associated with increasing levels of mental ill health in students (Bowman et al., 2020), which may adversely affect their inclusion in some aspects of contemporary educational experience. Adolescence is a developmental stage characterised by significant physical, cognitive, emotional and social changes (Crain, 2016), and secondary schools are required to effectively navigate these challenges together with an ever-increasing responsibility to accommodate students with diverse learning needs. Alternative, novel interventions and supports, such as canine-assisted therapy (CAT), recognise that traditional educational approaches may not adequately address these evolving student needs and complexities associated with contemporary secondary school settings. Several student profiles with specific exceptionality characteristics, such as Level 1 autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), or other mental health requirements, may necessitate special support provisions that allow students to participate in education on the same basis as other students.

This study draws on research which investigates the phenomenon of CAT and the features of it that may positively influence adolescent student learning and inclusivity. Secondary school students, diagnosed with ASD and/or anxiety, are a particular focus. Intervention recommendations to secondary schools will center on programs that are effective, safe and evidence based (Grové et al., 2021). To examine the efficacy CAT as an intervention for secondary school settings requires a more comprehensive understanding of the current state of knowledge in these fields. Understanding the complex nature of adolescence, ASD and anxiety provides the context necessary for worthwhile interventions and supports. While the context of this present study is Australia, CAT has been more widely applied throughout the world—including Czech Republic (Machová et al., 2019), Hong Kong (Fung, 2019), India (Narvekar, 2023), and South Africa (Lubbe & Scholtz, 2013)—and it is from this broader context that the study draws its data.

### LITERATURE REVIEW

**Autism Spectrum Disorder in an Educational Setting.** Autism spectrum disorder is a neurological and developmental disorder that affects how people interact with others, behave, communicate and learn (Grzadzinski, Huerta, & Lord, 2013). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2022), individuals with ASD have difficulty interacting and communicating with people, exhibit behaviors that can be repetitive and can display restricted interests, and these symptoms can affect their ability to function in school, work and life more generally. The Manual describes three levels of ASD, ranging in severity to indicate how much support may be needed by the person with ASD (Christopher & Lord, 2022).

Use of the word 'spectrum' indicates there are many different points and characteristics within that range, suggesting every individual with ASD manifests symptoms of autism at different levels and exhibits different behaviors and needs, which in turn reflects different educational requirements (Christopher & Lord, 2022; Grzadzinski et al., 2013). While still in use, the term Asperger's Syndrome does not appear in the latest version of the DSM-5. Those diagnosed in

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the past with Asperger's Syndrome would now be identified as having Level 1 ASD (Leatherland, 2018; Van Steensel & Heeman, 2017).

Although Level 1 is the least severe autism spectrum disorder diagnosis, the DSM-5 (2013) states people who receive this diagnosis require support, and individuals without proper support will display noticeable impairments in social communication (Christopher & Lord, 2022; Probst & Leppert, 2008). Common behaviors in individuals with Level 1 autism include inflexibility in behavior and thought, difficulty switching between activities, problems with executive functioning, and increased risk of mental health conditions, in particular anxiety, all of which hinder independence (Leatherland, 2018; Van Steensel & Heeman, 2017).

Teachers are often the first to recognise Level 1 ASD symptoms in older children and adolescents (Christopher & Lord, 2022). Students are typically observed experiencing social difficulties, including problems with subtle communication, namely understanding facial expressions, tone of voice or body language and display significant symptoms of anxiety (Grzadzinski et al., 2013). Older children and adolescents may have difficulty understanding sarcasm, humor and figures of speech (Grzadzinski et al., 2013). Thus, ASD is seen as a complex neurological disorder impacting overall functional development, including affecting the ability to engage in intimate and meaningful social interactions (Petrina, Carter, & Stephenson, 2014), which significantly impacts students forming meaningful friendships with peers.

**Adolescence and Anxiety.** The World Health Organisation (WHO, 2021) states 14% of children and adolescents aged ten to 19 experience mental health issues. Anxiety can manifest in adolescents cognitively, behaviourally and socially. Persistent and intrusive thoughts about school performance, social interactions or their future can become catastrophic in some cases, imagining worse-case scenarios and only focusing on potentially negative outcomes (Garcia & O'Neil, 2021). Adolescence is marked by a period of stress impacting concentration and task focus, especially with schoolwork, experiencing a preoccupation with worry (Zents, 2017).

Perfectionism is not uncommon in adolescents, especially students diagnosed with Level 1 ASD (Volkmar, Jackson, & Hart, 2017) contributing to increased anxiety. Striving for perfection in their academic or social endeavours and placing unrealistically high expectations on themselves causes further stress and anxiety (Mossman et al., 2017). The fear of judgement, criticism from others, self-doubt and negative self-talk are all symptoms of unhelpful thought patterns in adolescents with anxiety. Adolescents with mental health conditions, such as anxiety, are particularly vulnerable to discrimination, social exclusion, educational difficulties, stigma and risk-taking behaviours (WHO, 2021).

**Autism Spectrum Disorder and Anxiety.** Medical comorbidities are more common in children and adolescents with ASD than in the general population (Al-Beltagi, 2021). Moreover, research indicates that co-occurring mental health conditions can become more prevalent as children with ASD age (Angus & Monson, 2014; Dickson et al., 2021). This understanding has prompted recent research to focus on the combination of ASD and comorbid mental health conditions, bridging the two to include mental health interventions as part of a student's overall support (Dickson et al., 2021). Excessive anxiety can impact an adolescent's functioning within a school setting, and concentration and focus, along with processing and storing information, can be significantly compromised (Moran, 2016).

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Additionally, anxiety can have various behavioral and social impacts, such as executive function deficits, difficulty with social interactions and school refusal (Perihan, Bicer, & Boccanegra, 2022; van Steensel & Heeman, 2017). Perihan et al. (2022) state anxiety is the most common mental health problem that occurs with ASD and note evidenced-based programs targeting ASD symptoms can indicate improvements in targeted skills. However, empirical research had not found compelling evidence for improvements in specifically targeted internalised anxiety symptoms. When considering support and interventions for students diagnosed with Level 1 ASD, it is therefore important to consider co-occurring mental health conditions, such as anxiety.

**Canine-Assisted Therapy.** The use of animals, particularly canines, as a source of therapy is not a new phenomenon. O’Haire (2013) noted the rationale behind using canines as an intervention stem from a multi-disciplinary field of research known as human-animal interaction (HAI), which encompasses the dynamic relationship between humans and animals, where people seek out contact with animals as calming and non-judgmental sources of support and facilitators of social interaction. Yap, Scheinberg and Williams (2016) concurred with O’Haire (2013) and reported the mutualistic relationship between canines and humans has extended over 140,000 years, according to archaeologists. Yap et al. also suggested CAT’s scientific basis stems from the field of anthrozoology, which studies how this mutual relationship influence physical and psychosocial well-being.

Koukourikos et al. (2019) correspondingly reported the history of utilising animals for therapeutic purposes as a source of stress relief and relaxation, noting more recent research has documented the positive consequences of human-animal interaction and its potential medicinal health benefits. Koukourikos et al. went on to note that recent studies focusing on human-animal interaction show how collaborative relationships with animals provide a complementary or alternative form of treatment for various types of mental health conditions.

Research targeting students diagnosed with ASD have specifically indicated increased social interaction and connection between participants, including a significant improvement in quality and quantity of verbal social behaviour (Hardy & Weston, 2020; Petrina et al., 2014). Findings from both qualitative and quantitative research support the notion of that CAT increases student engagement in tasks, including the motivation and confidence to interact and communicate about the task (Hediger, 2014; Protopopova et al., 2020). Becoming less rigid and more willing to participate in an unfamiliar activity, or displaying greater flexibility to move from one task to a less favoured one, was observed in students during CAT interventions (Protopopova et al., 2020; Tepper et al., 2022). Additionally, improved concentration during completion of activities and a reduction of disruptive behaviours has been noted in a number of recent studies (Maricevic, 2022; Popa, 2022).

The involvement of animals in education, in particular the involvement of canines, has become an increasingly common sight in schools and other educational settings, many through visitation programs (Putz, 2014). These programs use volunteer trained therapy dogs and handlers primarily to facilitate children’s reading (Putz, 2014). The use of therapy dog reading programs in schools to improve literacy skills has become a popular phenomenon, and research into these programs has provided multifaceted data that suggest CAT may have positive implications for learning (le Roux et al., 2015; Wohlfarth et al., 2014). Wohlfarth et al. (2014) noted the presence of a therapy dog positively impacts cognitive task performance.

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Several studies purport gains in learning outcomes with one-on-one or small group interventions. The findings endorse canine-assisted reading intervention programs and substantiate they have the potential to enhance performance and learning through self-efficacy, enjoyment, motivation and the reduction of stress and anxiety (Hall, Gee, & Mills, 2016; Sorin, Brooks, & Lord, 2015). According to Gee and others (2017), these features of CAT are transferable and have implications for learning across all educational environments.

Hardy and Western (2020) define CAT as a form of therapy using a canine to facilitate progress toward a therapeutic goal. In addition, Kropp and Shupp (2017) identified the possible benefits of having a trained therapy dog integrated into the professional role of an educator, counsellor or therapist but also noted therapeutic goals needed to be implemented as part of the intervention program. Smith and Dale (2016) were less specific around the need for explicit goal setting and more inclined to view canines in educational settings as facilitators of student interaction, motivation and encouragement. Similarly, Maricevic (2022) argued the less formal approach to CAT still encouraged overall goals and objectives to be met but immediate treatment goals did not need to be specified.

**Adolescence and Canine-Assisted Therapy.** Evidence suggests that CAT results in a reduction of anxiety symptoms in children and adolescent populations with neuro-developmental difficulties (Becker, Rogers, & Burrows, 2017; Schuck et al., 2015). These features may effectively reduce stress and anxiety in any secondary school student, as adolescence is a distinct transitional stage of growth and development. During this period, adolescents undergo significant changes in various aspects of their lives as they strive for independence and shape their identities (Geldard, Gerald, & Foo, 2019). Important processes of change need to occur within the young person if these challenges are to be confronted adaptively and with success (Zents, 2017). Adolescence is also a time where young people face increasing academic demands and responsibilities which can intensify stress around academic performance, extracurricular activities, and social interactions (Geldard et al., 2019; Zents, 2017). Overall, adolescence is a period of change that prepares young people for the transition to adulthood. These challenges are significantly magnified for students diagnosed with Level 1 ASD (Rattaz et al., 2020; van Schalkwyk & Volkmar, 2017) and may increase the likelihood of students developing mental health conditions during secondary school (Volkmar et al., 2017).

An intervention for this age group needs to engage and overcome the potential stigma associated with seeking mental health support or intervention. Moreover, support processes and possible interventions need to be especially appealing to a young person (Zents, 2017). Current research on CAT has identified its use as an effective tool to assist with rapport building and engagement (Fine, 2019; Sheckler, 2017). The presence of an animal, in particular a canine, makes counsellors and teachers seem more trustworthy, increasing rapport, encouraging participation and reducing feelings of stress and anxiety (Kropp & Shupp, 2017). These findings provide support for anecdotal claims that CAT could be an effective tool and well-accepted intervention for adolescents with Level 1 ASD and anxiety in a secondary school.

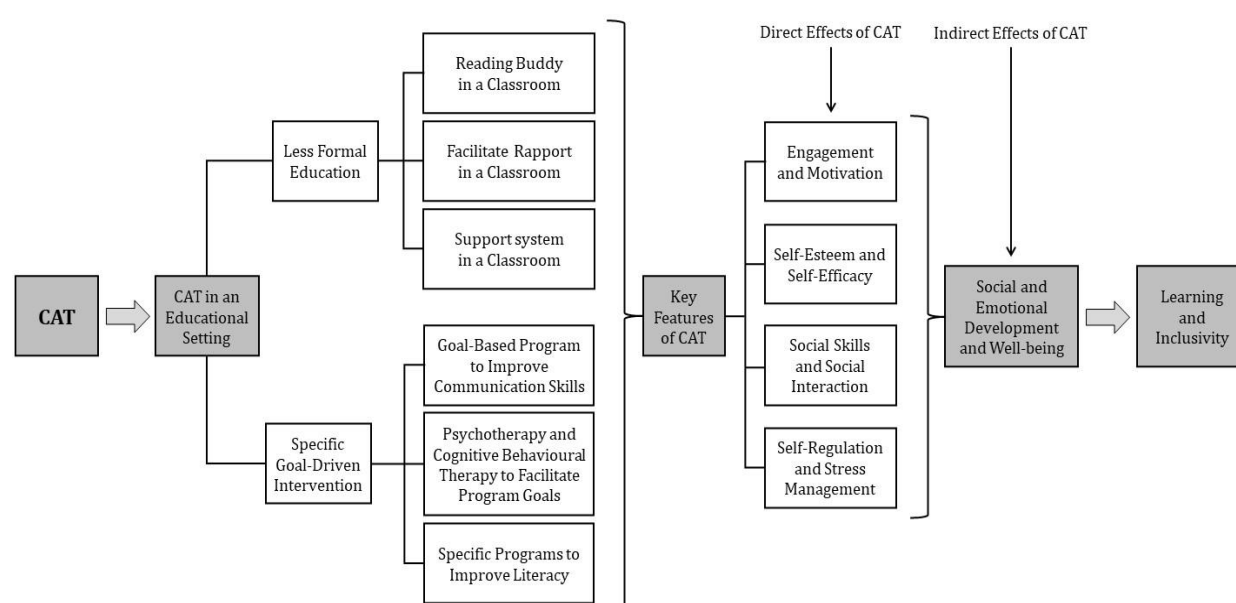
The underlying belief behind canine assisted therapy is the preconceived notion that animals are beneficial to humans (Collier et al., 2022). Due to increasing popularity, it is therefore important to ensure CAT is as effective as it claims. It is unethical to use an intervention that is not evidence based especially as there are so many other evidence-based interventions for ASD and anxiety (e.g., Carvalho, 2019; Nieforth, Schwichtenberg, & O'Haire, 2023). Conversely, what constitutes CAT that effectively meets individual student needs across school

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settings remains ambiguous. To examine the efficacy CAT as an intervention in secondary schools and for students diagnosed with Level 1 ASD and symptoms of anxiety requires a more comprehensive understanding of the current state of knowledge in the field, and hence the need for this study.

Ambiguity around the definition of CAT (Jones et al., 2019), along with a dearth in the literature of CAT targeting secondary school students (Maricevic, 2022; Trujillo et al., 2020), in particular adolescents diagnosed with Level 1 ASD and anxiety (Perihan et al., 2022), offers the opportunity to systematically investigate the topic and narrow a clearer understanding of the features and qualities of CAT. Moreover, a gap in the literature related to the effective use of CAT in a secondary school setting was identified. This necessitated the need to investigate a diverse range of literature with the intention of gaining a holistic understanding of CAT and its potential implementation into secondary school settings for students diagnosed with Level 1 ASD and anxiety.

**Theoretical Framework.** Canine-assisted therapy is an umbrella term for multiple types of intervention that include less formal interventions that do not adopt specific goals or goal-driven interventions (Abat-Roy, 2021; Maricevic, 2022). Canine-assisted therapy is a diverse field of study and is becoming increasingly popular in educational and health settings. This research focuses on secondary schools. Therefore, the following theoretical framework encompasses the use of therapy dogs in educational settings. Based on data from the literature, Figure 1 graphically presents the variety of interventions and programs involving canines in school settings, along with the current emphasis on direct effects of canine-human interaction on student engagement, self-regulation, motivation, stress management and social interaction, as well as indirect effects on social-emotional development, social and emotional well-being, and learning, adapted from Gee et al. (2017). In all cases, CAT is designed to enhance student learning and hence inclusivity into secondary school education.



**Figure 1: Theoretical framework of less formal and goal-driven interventions and programs involving canines in the educational setting.**

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Informed by published literature findings, this framework conceptualises the link between CAT and student learning outcomes and inclusivity. Although CAT can be implemented in different settings, such as hospitals and private practice organisations, this framework concentrates on the characteristics of CAT as an educational intervention and the features that may lead to improved student learning. In keeping with inclusive education, the framework correspondingly emphasises the flexibility of CAT which supports the multidimensional nature of secondary education and individual student requirements.

**Objectives and Research Questions.** The purpose of this research is to investigate what prior literature has shown are the key features of CAT and to construct a deeper understanding of this phenomenon in the context of secondary education. The following two research questions will therefore guide this study: RQ1—What themes emerge from the literature on CAT when it is used with secondary school students; and RQ2—What specific themes of CAT emerge from the research literature on anxiety in adolescents, in particular for secondary students diagnosed with ASD?

In answering RQ1, a deeper understanding of the phenomenon of CAT in a secondary school setting is the overall aim of this research. Characteristics of CAT that emerge from researching the literature in a systematic and sustained way will be analysed to provide a holistic understanding that can inform decisions for CAT implementation in secondary schools. In particular, in answering RQ2, an understanding of CAT's potential role as an intervention to reduce anxiety symptoms in adolescents diagnosed with Level 1 ASD will be developed. The intended outcome of the study will therefore be a deeper knowledge of CAT and through that knowledge provide an opportunity to critically appraise research data in order to guide and inform best practice in future learning support and counselling roles (Whittemore & Knafl, 2005).

### **METHODOLOGY**

The methodological approach used for this study is an Integrative Literature Review (ILR). An ILR is suitable in this context because it will allow a comprehensive understanding of the current state of knowledge in the field of CAT from studies of various methodological designs and contexts (Snyder, 2019), and identify and integrate key findings and themes that may impact future policy and practice decisions for implementation in secondary school settings (Whittemore & Knafl, 2005).

The framework for ILRs, described by Toronto and Remington (2020), was followed as it allows a combination of diverse quantitative and qualitative data sources that contribute to various perspectives of a phenomenon (Snyder, 2019). To ensure transparency, the ILR followed standardised search procedures utilised by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol (Sarkis-Onofre et al., 2021).

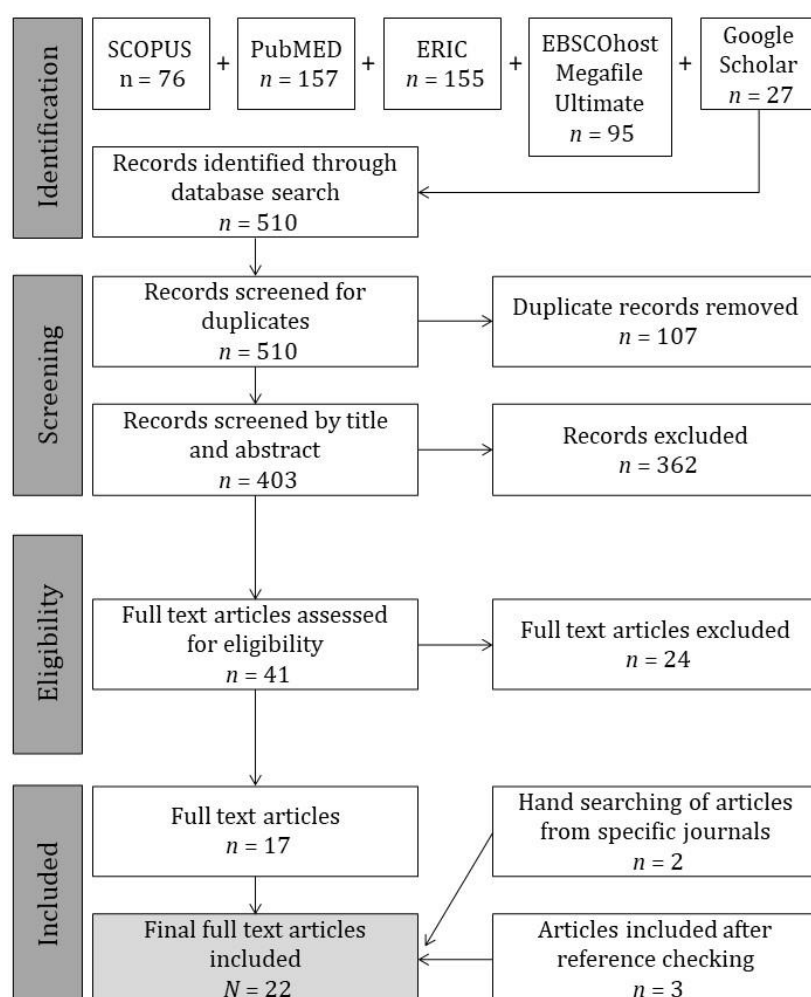
**Inclusion Criteria.** Six inclusion criteria were: 1) academic articles relevant to animal-assisted therapy, which include canines, ASD, and/or anxiety; 2) quantitative, qualitative, and mixed methods research, and reviews; 3) peer-reviewed articles in academic journals that meet accepted standards of methodological quality; 4) peer-related articles related to children or adolescents and in an educational or health setting; 5) articles published in English; and 6) articles focused on features of CAT that would benefit student learning outcomes. In this ILR, the inclusion of three articles addressing CAT in a university setting were included as participants were still considered to be adolescents according to the World Health Organisation definition (WHO, 2021).

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**Exclusion Criteria.** Five exclusion criteria were: 1) books, reports and any other sources of information not presented in peer-reviewed journals; 2) articles which reported use of service dogs and other types of working dogs, such as guide dogs, and police or military dogs; 3) duplicate papers; 4) studies published more than ten years old; and 5) articles focusing on young children (i.e., < 12 years of age).

The remaining articles were screened by the first author by reading the title and abstract to assess if they met the inclusion criteria. Matching articles were read in full; 24 articles were excluded based on not answering the aim of the ILR. Reference lists of articles read in full text were reviewed; three additional studies meeting the inclusion criteria were identified and included.

Two hand-searched journals (*Frontiers of Veterinary Science* and *Child and Adolescent Social Work Journal*) identified two important articles which were incorporated into the final 22 articles for data analysis. The final 22 articles included six quantitative studies, seven qualitative studies, five mixed methods studies, and four literature reviews. Six Australian and 16 international articles were reviewed. The selection process of four stages—identification, screening, eligibility, and inclusion—is shown in Figure 2.



**Figure 2: Four-stage article selection process.**



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**Search Protocol.** The search protocol was designed to be broad and inclusive in order to capture the range of terminology used in CAT. Literature was sourced from four specialist databases—SCOPUS, EBSCOhost Megafire Ultimate, ERIC, and PubMed—as well as Google Scholar, and hand-searching two specific journals and references from 15 relevant literature reviews. The databases were selected because they covered both health and educational research studies, thus maximising accessibility to published literature.

Search terms included: (animal-assisted therapy OR canine-assisted therapy OR dog-assisted therapy OR therapy dog) AND (ASD OR autistic spectrum disorder OR autism\*) AND (anxiety OR depression) AND (school OR young person OR teen\* OR adolesc\*). Other terms used in subsequent searches included: (effect\* OR affect\*) AND (counselling OR intervention OR learning OR therapy\* OR anxiety\* OR emotion\*) AND (youth OR young person OR teen\* OR adolesc\*) AND (animal OR dog\* OR canine OR animal assisted therapy), (canine assisted therapy OR animal assisted therapy OR dog assisted therapy) AND (anxiety OR depression OR mental health).

These search terms were used in various combinations to elicit the maximum number of results, and key concepts identified in the search strategy for this ILR mirror the two research questions. The template for constructing the initial search strategy is shown in Table 1.

**Table 1: Initial search strategy.**

Key Concept #1		Key Concept #2		Key Concept #3		Key Concept #4
animal-assisted therapy OR canine-assisted therapy OR dog-assisted therapy OR therapy dog	AND	ASD OR autism OR autism*	AND	anxiety OR depression	AND	school OR young person OR teen* OR adolesc*

**Analysis of Literature.** All papers retrieved by the ILR were assessed for validity and applicability to the search criteria. Critical analysis was undertaken by dividing each article into several sub-topics, as shown in Table 2. These included: identifying the literature source and detailing the study design; main outcomes and findings of each article; a value judgement made as to the strengths and advantages and weaknesses and limitations of each research design; and finally implications for learning and education were recorded.

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**Table 2: Categorisation of research articles from the ILR.**

Literature Source	Topic Addressed	Type of Study or Research Design	Main Findings	Strengths and Advantages	Weaknesses and Limitations	Implications for Learning and Education
1. Baird, Berger, & Grové (2023)	Investigated therapy dogs and school well-being of K-12 students	Qualitative; <i>N</i> = 118; 16 open-ended survey questions to professionals with work or research experience of therapy dogs for children and adolescents; thematic analysis used to derive eight themes	Need for standardised protocols to ensure positive CAT implementation; evidence suggested CAT increased student's confidence, enthusiasm, motivation to attend school, engagement in activities, peer interactions, and reduction in stress and anxiety	Provided insights into the practical realities of implementing a CAT program in schools; encouraged further research to develop implementation protocols	Difficulties with participants understanding of the definition of CAT; study did not account for participant's bias	Indications support the concept that therapy dogs facilitate improvements in K-12 students behavioural, social, emotional and academic well-being at school; need for rules and guidance
2. Baird, Grové, & Berger (2022)	Investigated CAT for social and emotional well-being across K-12 in a school setting	Systematic literature review; critique and synthesis of the literature	Students and/or teachers found therapy dogs improved mood, but little impact on depressive symptomatology or internalisation of problems; improved social and emotional skills, confidence, interaction with peers; calmness, less aggressive behaviours and stress	A comprehensive analysis of literature and special settings; findings consistent with previous literature reviews	Some inconsistencies with methodological limitations of articles; small sample sizes and lack of statistical control measures	More rigorous studies needed to evaluate how to implement CAT in schools and maximise its benefits; development of specific guidelines to inform policy and practice is required
3. Chadwick, Edmonson, & McDonald (2022)	Explored the experiences of as reported by young people aged between 12-15 diagnosed with ASD/ADHD	Qualitative study using semi-structured interviews; three students aged between 12-15 diagnosed with ASD and/or ADHD	Three key themes: self-esteem; emotional benefits; and identification	Findings consistent with current literature which supports AAI as effective for young people with complex neurodevelopmental disorders	Small sample size; interviews can lack structure and direction; validity may be compromised due to researcher bias from prior professional relationships	Increased self-esteem, motivation and self-confidence can positively impact task performance completion and enjoyment; positive learning outcomes for ASD students
4. Delgado, Toukonen, & Wheeler (2018)	Examined effect of CAT on stress experienced by students during exam time	Quantitative physiologic and psychological data were collected from <i>N</i> = 48 university students before and after 30-minute therapeutic play sessions	Results support canine interactions can moderate the effects of stress in students during a stressful exam period; improvement in mood and reductions in perceptions of stress and	Reasonable number of participants; significant reduction in salivary cortisol levels consistent with earlier studies; provides a	Small but homogenous convenience sample, possibility of self-selection by those with a bias for a positive canine- student interaction; reliability and	Exam periods can be stressful and extreme stress can impact students' ability to focus and concentrate, thus

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Literature Source	Topic Addressed	Type of Study or Research Design	Main Findings	Strengths and Advantages	Weaknesses and Limitations	Implications for Learning and Education
			salivary cortisol levels	comprehensive set of measurements	validity of instruments	negatively impacting exam result; CAT shown to reduce indicators of stress
5. Flynn, Gandenberger, Mueller, & Morris (2020)	Clinicians' experiences of animal-assisted intervention as an adjunct therapy	Qualitative, phenomenological approach to identify common meanings that underlie $N = 23$ participants experiences	Self-regulatory behaviour was promoted; increased social and emotional competence; improved social skills in individuals who had severe social challenges	Validity gained through sharing themes with research participants to provide feedback on accuracy	Only perspectives of clinicians from a single institution; possibility of bias as institution known for its use of CAT	Youth with significant challenges and with low engagement in other therapies may benefit from CAT, thereby increasing school engagement and learning
6. Flynn, Moffitt, Taekens, Mueller, McWilliams, Shenfield, & Morris (2023)	Qualitative study examined the social and emotional development of youth with CAT in special education	Phenomenological approach with participants $N = 27$ with an average age of 12.6 years	Strengthened communication skills, self-esteem and confidence, greater communication connections, self-regulation, enjoyment, positive sensory experiences	Study offered insights into a special education setting and supported the current popularity of CAT as an intervention in this setting	Limitations engaging students to describe their personal experiences; interviews carried out by the school staff which may have risked bias; no consideration of the dog's well-being	CAT seen as a flexible intervention, depending on each student's developmental needs; ability to tailor intervention to individual needs positively impacted student learning outcomes
7. Fung & Leung (2014)	Role of CAT in facilitating social interaction among children with ASD	Quantitative study involving ten children with ASD who attended 14 sessions of CAT	Significant increases in verbal/social behaviour post CAT; therapy dog can act as a 'social catalyst' and a 'social ice-breaker'	Control group and development of a treatment manual increased methodological rigour	Small sample size; limited the statistical power	Social anxiety and lack of social interactions is a barrier for a student with ASD; CAT can facilitate social interaction and communication
8. Fynn & Runacres (2022)	Analysis of parent perceptions of the effectiveness of CAA in schools, mediated by child anxiety	Quantitative analysis to explore parental acceptability of CAA used with children; online survey included a scale to measure anxiety and acceptability	Parental acceptance was mainly positive; CAA was more acceptable for reading and social improvements than behaviour; need for schools to advocate	Reliability of instrument was measured using Cronbach's Alpha; results supported by current literature	Possible bias; question order may have skewed results; wording of survey may have skewed results as behaviour CAA wording said intervention would require a	CAA has potential to positively impact students' emotional and educational needs; the study emphasised the lack of awareness

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Literature Source	Topic Addressed	Type of Study or Research Design	Main Findings	Strengths and Advantages	Weaknesses and Limitations	Implications for Learning and Education
		across three cases administered to $N = 318$ participants	benefits of CAA at school		longer time period	parents had and need for them to advocate for this intervention
9. Gee, Griffin, & McCardle (2017)	Recent research relevant to the inclusion of animals in school settings and how AAI can impact learning	Exploratory study reviewing recent research, including systematic literature reviews, meta-analyses, and edited volumes	Increased socio-emotional development; increased motivation, engagement and learning; development of a theoretical framework; need for more educators to become researchers	Provided a theoretical framework with proposed questions for future directions of practice and research	Exploration of current research with limited evidence; school AAI programs require more evidence-based research with rigorous methodologies to inform policy	Theory supported increased socio-emotional development; AAI targeted social, emotional and cognitive development with guided AAI activities
10. Germone, Gabriels, Guerin, Pan, Banks, & O'Haire (2019)	Investigation of whether CAT can improve social behaviour of youth with ASD and a comorbid mental health problems	$N = 67$ ; experimental study; sessions occurred in hospital classroom with a small social skills group for a half-hour session with the therapy dog	Significantly more social verbal and non-verbal communication when compared to control; more engagement in the designated activity; more emotional display	Results support previous findings; this study was advantageous for its crossover design to control for multiple demographic variables	Findings were general; participants not randomised; short hospital stay did not allow for extended period of experimental period	ASD is associated with social skill deficits and co-occurring mental health difficulties; improved social skills in youth diagnosed with ASD; decreases in the likelihood of co-morbid mental health problems
11. Grové, Henderson, Lee, & Wardlaw (2021)	Perceived facilitative and impeding factors when implementing a CAT program in a school setting	Australian qualitative study involving 13 school staff and two coordinators from CAT organisations using an open-ended survey and semi-structured interviews	Whole school approach imperative; interventions integrated into daily practice are more successful; need for CAT to be flexible; need for consistent guidelines.	Although small scale, groundwork for further research in this field has been laid	Limitation of geographic/regional applicability; small number of participants that may not have had the opportunity to clarify their answers, which may have influenced results	Preliminary evidence suggests therapy dogs can enhance children's well-being; evidence indicated a link between well-being and learning outcomes; higher levels of well-being reduce absenteeism and increase academic engagement
12. Harris & Binfet (2020)	Exploration of children perceptions	Case study research with $N =$	CAT program provided an enjoyable and	Data may inform educators and	Difficult to conduct with multiple stakeholders;	Study theorises notion of canines as

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Literature Source	Topic Addressed	Type of Study or Research Design	Main Findings	Strengths and Advantages	Weaknesses and Limitations	Implications for Learning and Education
	of an after-school CAT social and emotional program	22 young children	positive experience; children demonstrated social and emotional learnings; therapy dogs facilitated social interactions.	policymakers seeking to incorporate CAT into their social and emotional curricula; data collected from multiple sources	diversity was limited; self-selection may skew results.	'co-educators' helping to foster relationships, promoting social-emotional skills, reduce stress, improve mood, and develop children's social and emotional competencies
13. Jones, Rice, & Cotton (2019)	Investigating the literature of AAT in mental health treatments for adolescents	Systematic review; studies reporting qualitative and quantitative psychological or psychosocial outcomes	Supports literature on the presence of a dog having a soothing, calming or stress relieving effect; therapy dog facilitates therapeutic alliance, increased retention rates and attendance, and increased disclosure in adolescents seeking treatment	One of few studies on adolescents; contributes preliminary evidence to support inclusion of CAT in mental health treatments for this hard to engage age group	Only two studies had sound methodological integrity; too few studies; details of interventions not well reported; studies may have self-selection bias	Stigma can be associated with seeking help in high school; CAT may be more adolescent friendly and engaging; CAT provides an important intervention worthy of further investigation
14. London, Mackenzie, Lovarini, Dickson, & Alvarez-Campos (2020)	Exploration of parent perspectives of AAT for children with ASD	Phenomenological approach to how parents interpret their experience; <i>N</i> = 17; occupational therapy in a school setting	Canines are valuable for behaviour regulation, communication issues and achieving group goals; canines seen as non-judgemental, facilitators of enjoyment, motivation and engagement	Enough data to encourage future qualitative research to explore perspectives of children and adolescents.	Possible bias due to pre-conceived ideas about canines; parent reporting may have been inaccurate; program may have benefited from a novelty effect	Canines promoted student engagement, intrinsic motivation and enjoyment; communication, behavioural regulation, and learning outcomes improved
15. Nieforth, Schwichtenberg, & O'Haire (2021)	Investigated current state of AAI as a treatment of ASD	Systematic review from 2016-2020 on AAI as a treatment of ASD	Social interaction remains the most commonly identified and promising outcome from both qualitative and quantitative studies; positive language and communication findings; improvements to positive emotions	Both qualitative and quantitative methods; all studies were analysed for methodological rigor and risk of bias	Possibility of publication bias, as all studies reported at least one significant finding	AAI considered an effective intervention for students with ASD but more rigorous research required

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Literature Source	Topic Addressed	Type of Study or Research Design	Main Findings	Strengths and Advantages	Weaknesses and Limitations	Implications for Learning and Education
16. Robino & Adams (2022)	Exploration of CAT in college and how it affects bond between counsellor and therapy dog, the effect and outcomes of student depression and anxiety	Mixed methods study; <i>N</i> = 40; semi-structured interviews; Counselling Centre Assessment of Psychological Symptoms-34 scores were explored for quantitative data collection	Positive impact of CAT in the counselling process; increased bond (i.e., therapeutic alliance) between counsellor and student; brief presence of a therapy dog had a positive effect on college students; counsellor required as much training as therapy dog for successful implementation of program	Preliminary positive implications of including CAT; qualitative analysis uncovered themes relating to the development of a relationship between therapy dog and therapist which can help inform future practice	Quantitative data was archival and not collected for the purpose of this study; small sample size; data came from one animal-assisted therapist from one university, so findings may not relate to other settings	Reduction in depression and anxiety symptoms positively impacted learning outcomes; a strong therapeutic alliance improves outcomes of counselling sessions
17. Schuck, Johnson, Abdullah, Stehli, Fine, & Lakes (2018)	CAT as intervention to improve self-esteem in children diagnosed with ADHD	Quantitative study; <i>N</i> = 80; randomised control design	Children's perceptions about their behavioural conduct, social competence, and scholastic capability were higher at post intervention when compared with control study who underwent psychosocial interventions; children were more motivated to attend and positively engaged	Large number of participants; randomised control study design; children's self-esteem measured across multiple domains; study occurred over a 12-week period with twice weekly interventions	Phenomenon of positive illusory bias could skew the results; further studies, including internalised symptoms focusing on self-compassion as an alternative to self-esteem, could improve results	Greater improvements in perceived self-confidence and academic performance with CAT than psychosocial interventions; self-esteem and perceived confidence are necessary for students to engage and take risks in their learning and to bounce back after adversity or failure
18. Smith & Dale (2016)	Examined the attitudes of Australian school teachers toward AAI for children with ASD	Online questionnaire made up of 41 closed and 14 open ended questions for teachers working with students diagnosed with ASD; <i>N</i> = 73 participants; thematic analysis was used to identify themes	Positive attitude and interest in including CAT interventions in a school/ classroom; improved social skills, facilitating student engagement, reduction of stress, anxiety, and behaviour problems; therapy dogs, most effective for school and	Participants had experience working with students with ASD; anonymous questionnaire; questionnaire allowed for some answers to be 150 words	Small scoping study that relied on self-report; utilised a sample of convenience that may have attracted teachers with a pre-existing interest in AAI; confusion around understanding and definition of AAI may have influenced responses	Innovative interventions to support students with disability important with inclusive practices policy in schools; lack of evidence-based data on effectiveness of animal interventions in the

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Literature Source	Topic Addressed	Type of Study or Research Design	Main Findings	Strengths and Advantages	Weaknesses and Limitations	Implications for Learning and Education
			classroom-based interventions			classroom and resources that inform staff and parents are barriers to implementation
19. Spruin, Dempster, Islam, & Raybould (2021)	Use of CAT to improve mental health of students ( $N = 94$ ) for reduction of anxiety when compared to mindfulness or student counsellor	Mixed measures design; all students were required to complete State-Trait Anxiety Inventory (STAI-Y-6) and the Mood Tracking Scale (MTS) before and after CAT sessions	Findings support the hypothesis that CAT is effective in reduction of anxiety and improved mood; therapy dogs are a source of social and emotional support	Large number of participants; positive findings; deemed to be a powerful and innovative way to improve student well-being and reduce anxiety without usual stigma	Only one session of therapy; results for long-term implications unknown; not a suitable intervention for everyone due to cultural or health implications	Excessive stress is a barrier to learning and a reduction of stress and anxiety and an increase in student well-being will improve educational and mental health outcomes
20. Verhoeven, Butter, Martins, & Enders-Slegers (2023)	Exploratory research on the positive impact of CAT on behavioural and emotional outcomes for school students	Mixed methods study; survey and observational studies; participants: teachers $N = 28$ ; students $N = 28$ in both experimental and control groups; CAT was used for structured sessions	CAT had a positive impact on focus for group activities; communication fostered; increased feelings of competence; higher level of autonomy and increased motivation to engage in tasks	Insights for both theoretical underpinnings and an improved understanding of the underlying variables through empirical measurement	Quasi-experimental design without randomisation; further development of theoretical framework and more substantial empirical evidence required; sample size, varying environmental conditions in schools, teacher age and experience, and varied home situations make multivariate analysis difficult	Collaboration between students to work together on tasks fosters social and emotional development, communication skills, task focus, motivation and self-confidence; all these are beneficial for producing positive learning outcomes in a classroom setting
21. Wintermantel & Grové (2022)	Evaluation of a canine-assisted social and emotional learning intervention in a school setting	Mixed methods, cluster-randomised, controlled trial with a parallel three-arm design in a school; each class was considered a 'cluster' of students aged 10 and 11.	Positive role of therapy dogs in schools by providing comfort and support in difficult situations, acting as social facilitators and improving students' attitudes to school and learning; CAT improved the efficacy of social and	Battery of both qualitative and quantitative measures, including observations, semi-structured interviews, self-perception surveys, anxiety scales, and	Study had no control group or baseline data	Improvement in social and emotional learning might aid long-term outcomes in educational achievement, well-being and mental health

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Literature Source	Topic Addressed	Type of Study or Research Design	Main Findings	Strengths and Advantages	Weaknesses and Limitations	Implications for Learning and Education
			emotional programs by making them a positive experience	questionnaires		
22. Wood, Ohlsen, Thompson, Hulin, & Knowles (2018)	Addressed the feasibility of an unstructured group CAT intervention to reduce stress in university students	Quantitative study; <i>N</i> = 131; stress measured by the complete State-Trait Anxiety Inventory (STAI) and blood pressure	Statistically significant reduction in systolic and diastolic blood pressure and in state anxiety; group-based intervention showed significant results in reduction of stress and anxiety	Large cohort; cost-effective intervention; stress as well as biological markers of stress, were measured	Controlled study recommended for further investigation; self-selection bias could influence results	A reduction of stress and anxiety improves educational outcomes in tertiary setting; improvement in clinical anxiety might support counseling with therapy dogs

**Integration of Results.** Thematic analysis to identify codes and themes was applied to capture meaning and language related to the research questions using the approach advocated by Braun and Clarke (2006; Braun et al., 2018). Thematic analysis fosters a holistic understanding of the research landscape by highlighting the interconnectedness of various studies and their common threads, and is one of the recommended data analytic approaches recommended by Toronto and Remington (2020) for ILRs.

Themes were developed using both semantic and latent codes culminating in six main themes and 12 sub-themes. Themes, sub-themes and their sources in the literature are shown in Table 3. In the following results section, these article identifiers will be used to link theme to source literature in the ILR, for example [1,2,3] is a reference to Baird et al. (2022), Baird et al. (2023), and Chadwick et al. (2022).

## **RESULTS**

A breadth of themes and features of CAT for children and adolescents were identified. Interplay and natural overlap of the fabric of each theme and sub-theme reflected the multidimensional and complex nature influencing the use of therapy dogs in secondary school settings where positive learning outcomes for students are the aim. An average of just over three themes were identified in each article. Table 3 shows the themes and sub-themes as identified in each article.

**Theme 1: Student Well-being.** While student well-being refers to the overall state of physical, social, and mental health of students within an educational context (Anderson & Graham, 2016), specific features of CAT that contribute to student well-being were identified by the ILR. A sense of happiness and calmness were commonly referred to when discussing overall well-being while academic goals were pursued. Study 1 suggested therapy dogs contributed to a positive classroom and school-wide atmosphere.

Positive environments facilitated by a therapy dog in the classroom or at school played a pivotal role in promoting student well-being [1,2,3,17]. Study 11 added that there is an association between well-being and learning outcomes and that an environment that supported student



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well-being and promoted a sense of belonging is imperative in a secondary school. Study 11 also suggested there is growing evidence that CAT may enhance children and adolescents' well-being by promoting more effective learning environments.

**Table 3: Themes and sub-themes identified by the ILR by selected articles.**

Selected Articles	Theme 1: Student Well-being	Theme 2: School Engagement	Theme 3: Social Connection	Theme 4: Positive Staff-Student Relations	Theme 5: Stress Reduction	Theme 6: Meeting Individual Student Needs
	Sub-themes: Happiness; Calmness	Sub-themes: Motivation; Confidence	Sub-themes: Communication; Self-awareness	Sub-themes: Rapport; Disclosure	Sub-themes: Mood Enhancer; Distraction	Sub-themes: Security and Comfort; Tailored Program
1. Baird et al. (2022)	X	—	X	X	X	—
2. Baird et al. (2023)	X	X	X	—	X	—
3. Chadwick et al. (2022)	X	X	X	—	X	—
4. Delgado et al. (2018)	—	—	—	—	X	—
5. Flynn et al. (2020)	X	X	X	X	—	X
6. Flynn et al. (2023)	X	X	X	—	—	X
7. Fung & Leung (2014)	—	X	X	—	X	X
8. Fynn & Runacres (2022)	X	X	—	X	—	X
9. Gee et al. (2017)	—	X	X	—	—	—
10. Germone et al. (2019)	X	X	X	X	—	—
11. Grové et al. (2021)	X	—	—	—	—	X
12. Harris & Binfet (2020)	X	X	X	X	X	—
13. Jones et al. (2019)	X	X	—	X	X	—
14. London et al. (2020)	X	X	X	X	—	—
15. Nieforth et al. (2021)	—	X	X	—	X	—
16. Robino & Adams (2022)	—	—	—	X	X	X
17. Schuck et al. (2018)	—	X	X	—	—	—
18. Smith & Dale (2016)	X	X	X	—	X	—
19. Spruin et al. (2021)	X	—	—	—	X	X
20. Verhoeven et al. (2023)	—	X	X	—	X	X
21. Wintermantel & Grové (2022)	X	X	X	—	—	X
22. Wood et al. (2018)	X	—	—	—	X	—

Happiness and well-being are interconnected states of being that encompass physical, emotional and, mental aspects of a student's life (Alexander et al., 2021). Achieving and sustaining happiness is often a component of overall well-being (Alexander et al., 2021). While overall student well-being was identified in a number of papers as a feature of CAT [11,14,19,21,22], happiness was specifically named as an important component of student well-being. For example, study 14 discussed parental perceptions of children's experiences from observations of CAT sessions at school; "[I am] happy that he enjoyed himself" and "It was like the [therapy] dog being there brought out this amazing joy and happiness within him", were common

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reflections. In a case study of an after-school CAT program, study 12 evidenced comments such as “the [therapy] dog made me feel good”, “the [therapy] dog made me happy and excited to be there”, and “[therapy] dogs cheer people up”. In the quantitative study 10, youth diagnosed with ASD and receiving psychiatric treatment in a hospital were engaged in a CAT hospital school program. Results suggest 2.5 times more smiling, 3.2 times more laughing and twice the number of positive vocalisations (e.g., “this is fun”) compared to a control group. Student and teacher reflections in a number of studies identified “student happiness” as an integral part of having a therapy dog as part of an activity, in the classroom or integrated as part of the whole school environment [2,6,12,14,18].

A sense of calmness is a component of well-being essential for managing stress and allowing students to focus on learning. Calmness in the classroom lays the foundation for effective teaching and optimal student learning experiences (Richardson et al., 2016). Study 2 reported that participants cited therapy dogs enhanced students’ well-being and learning outcomes by modelling concentration, focus and calmness; study 12 found the presence of therapy dogs assisted students to calm down or behave better; and study 13 discussed a therapy dogs’ ability to increase feelings of calmness in students; self-soothing and feelings of attachment were evidenced. These perceptions were described by a secondary school deputy principal who recounted “the [therapy] dog sits calmly and attentively when the teacher is talking...some students watch this and do the same” [2]. A number of studies discussed how students perceived therapy dogs to be soothing and comforting, and allowed them to feel more centered [3,5,6].

Student well-being is paramount in creating a nurturing and inclusive educational environment because children and adolescents spend many hours in school where they experience a range of social and emotional challenges [2]. A number of studies emphasised the importance of student well-being and how therapy dogs may provide additional support of it [2,5,6,12, 21].

**Theme 2: Student Engagement.** Student engagement in a secondary school is pivotal for holistic development and academic success. It fosters active participation, critical thinking and a general curiosity for learning. Engaged students are more likely to absorb and retain knowledge as they are emotionally invested in their education (Parsons & Taylor, 2011). A number of studies concurred with the importance of student engagement and identified CAT as a powerful tool in enhancing the engagement of students in various educational settings [5,12,20,21]. For example, study 5 detailed how therapy dogs were a potent factor in getting students “unstuck” providing a sense of curiosity and optimism in the task. Evidence conveyed by study 5 showed participants perceived work was less of a chore, and there was a shift from oppositional to a cooperative task engagement. Study 12 discussed teacher perceptions of a CAT program with teachers rating student’s as being very engaged to extremely engaged. One teacher perceived student’s increased engagement and eagerness to participate in tasks as really “standing out” in comparison to the program without a therapy dog.

A number of studies addressed inclusive education and how teachers and interventions needed to accommodate diverse learning styles and student needs to enhance engagement, of which CAT was purported to assist [2,12,17,18]. Canine-assisted therapy changed the dynamic of classrooms, and provided students with non-judgmental support, helping to model concentration and focus [2]. Student retention in counselling and school attendance was also reported to improve with the presence of a therapy dog [2,13]. Study 2 reported a school principal’s

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reflection, “we have a higher attendance on days students know [therapy] dogs will be in”. Motivation and confidence are integral pillars of student engagement and a number of the reviewed articles specifically referred to how CAT can enhance them.

Motivation acts as a driving force to initiate and sustain engagement. When students are motivated, they are more likely to actively participate in their learning experiences, set goals, and invest effort in their academic pursuits (Parsons & Taylor, 2011). Study 5 described students displayed a high level of investment and internal motivation when participating in activities involving a therapy dog. Study 14 reported CAT increased students’ motivation to complete non-preferred activities, try new activities and maintain motivation with the activity over a sustained period of time. And studies 17 and 20 both discussed the strong relationship between play and intrinsic motivation and how interaction with a therapy dog might increase intrinsic motivation resulting in deep learning. Adolescence can be a challenging time, marked by increased academic pressure and emotional turbulence. Study 15 reported therapy dogs helped motivate students to participate in and continue with the therapeutic process of school counselling. A number of studies suggested the presence of therapy dogs significantly boosted students’ motivation to attend school and participate in learning [2,5,14].

Motivation and confidence are interwoven and directly impact student engagement. When students feel confident in their abilities, they are more inclined to actively participate in classroom activities, discussions, and assessments. Study 14 stated parents perceived the inclusion of therapy dogs in a classroom setting increased student confidence, their willingness to try new things and extend themselves beyond their initial capabilities. Several studies highlighted the impact of CAT on student confidence by increasing perceived student self-efficacy and competence [3,5,20]. Studies 3 and 20 noted that during interaction with therapy dogs students perceived themselves to be more confident in their own abilities, and felt that therapy dogs allowed them to develop skills that encouraged them to recognise their achievements, but also positively acknowledge a mistake without negatively impacting their confidence and self-esteem.

Study 12 found teacher perceptions of a CAT program evidenced students’ confidence as learners increased and leadership and role model skills developed. The active and enthusiastic participation of students in their learning experiences is facilitated by a rich and dynamic learning environment. A number of studies endorsed CAT as a means to foster positive student engagement [2,5,12,20].

**Theme 3: Social Connections.** Social connections in schools are critically important as they foster a sense of belonging, emotional well-being and personal growth among students. When students feel connected to their peers and teachers, they are likely to be more engaged, motivated, and resilient in the face of challenges (Capella et al., 2013). For students diagnosed with ASD, forming meaningful connections can significantly impact their overall well-being and educational experience [15]. A number of studies described schools that promoted inclusivity through CAT, which fostered positive nurturing learning environments [2,11,12]. Study 11 described how the implementation of a school CAT program, encouraged prosocial behaviours, with the therapy dog acting as a ‘social catalyst’ to facilitate student interactions. A similar concept was noted in a number of studies. For example, study 12 described the therapy dog acted as a ‘social lubricant’ that facilitated some of the positive social interactions observed during a CAT program. The authors of study 11 labelled therapy dogs ‘social buffers’,

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used to enable social engagement and cohesiveness in large social settings such as classrooms or whole school environments.

Study 15 reported that social interactions remained the most identified and most promising outcome of a number of quantitative and qualitative research studies. The authors reported a therapy dog acted as a non-judgmental companion and support figure and functioned as ‘a bridge’ to expediate social interactions. Study 2 similarly discussed teacher perceptions of a CAT program and found therapy dogs were perceived to significantly encourage and support students to engage in social interactions. Canine-assisted therapy provided more opportunities for students to develop their social communication skills [2]. One particular teacher stated that a therapy dog “...motivated students to come together and learn social norms” and students had “confidence to make friends at school...helps them to feel they belong at school”. Study 20 examined student and teacher perceptions post CAT in the classroom. More positive relationships with peers, liking their classmates better, positive group activity interactions and increased interactions between both teacher and classmates were recorded. Effective communication is essential for social interaction, as it allows individuals to express their thoughts, emotions and intentions clearly. A number of studies viewed this component of social interaction to be key [6,7,10,14].

Canine-assisted therapy was discussed in studies which used both qualitative and quantitative methods to investigate its effectiveness in improving communication skills in students diagnosed with ASD [7,10,14,20]. For example, study 10 reported significantly more social communication was observed with CAT when compared to a non-CAT control. Participants talked more to peers, teachers and the therapy dog, more socially directed eye gaze was observed, along with directed verbalisations about the therapy dog to peers.

Study 7 discussed the benefits of CAT for students with social deficits. The authors reiterated that although therapy dogs are non-verbal in their communication, they are intentional in their behaviour, noting that students diagnosed with ASD may comprehend a dog’s communication better than a human, which can include metaphors, irony, pretense and deception, communication nuances which can be challenging for students diagnosed with ASD to interpret. The authors also inferred from their results that a therapy dog facilitates verbal social behaviours and acted as a ‘speech elicitor’, shaping a meaningful and comprehensible verbal language environment.

Self-awareness is an important component of appropriate social interaction. According to several reviewed papers, therapy dogs played a notable role in fostering student self-awareness [6,12,18]. Study 2 claimed CAT helped students regulate behaviour by modelling self-regulation; study 6 supported this view, with observations of improved self-regulation post-CAT intervention which demonstrated students were increasingly aware of their own dysregulated behaviour, such as being angry. Studies 17 and 20 both commented on improved behavioural awareness post-CAT intervention, which in turn increased students’ self-perception and feelings of self-worth. During these CAT interactions, students became more attuned to their feelings, displayed improved emotional regulation, and demonstrated increased evidence of empathy. The authors of study 17 especially viewed the therapy dog as an immediate and non-verbal means of feedback to which students responded positively. Additionally, study 14 observed students learning to control voice volume, tone and pitch during CAT, which in turn improved group communication and dynamics between students; such an outcome apparently fostered classroom inclusiveness.

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**Theme 4: Positive Staff-Student Relationships.** Previous research has demonstrated positive student-staff relationships foster a supportive and nurturing environment that is conducive to effective learning and inclusivity (Newberry, 2010). When students feel valued, respected, and connected to their teachers and other school staff, they are more likely to be engaged in their studies, motivated to learn, and open to seeking help or guidance when needed. A recurrent theme of the creation of positive staff-student relationships from CAT emerged in several of the studies [1,18,20,22]. A therapy dog was described as a ‘catalyst’ in fostering positive relationships between teachers, school counsellors and students.

In the study 20, teachers concluded a therapy dog in the classroom improved students’ attitude to work, peers and teachers. Teachers felt more confident in the emotional stability of students and noting more all-round interaction. Study 18 suggested teachers perceived CAT as an opportunity for them to engage with students in a more relaxed and non-threatening atmosphere, which in turn created connectedness to the learning episode, peers and teacher. The classroom becomes an environment where stress, anxiety and problem behaviours decreased, allowing for more effective learning and social interaction.

Studies 1 and 21 found therapy dogs acted as ‘social facilitators’ by enhancing the relationship between the student, peer and teacher. Therapy dogs served as a common and neutral point of interest, giving students and teachers an easy conversation starter and a comfortable, empathetic environment, something other authors also observed [18,20]. In student-staff relationships, whether between teachers, counsellors or mentors, the establishment of rapport creates an environment of trust and mutual respect.

Whilst evidence of improved student-staff relationships from CAT implementation was identified in a number of studies, indications of improved rapport in student-staff relationships was specifically identified in six papers [1,2,12,13,14,16]. In counselling, rapport serves as the foundation for productive therapeutic alliances. Study 16 discussed how the therapy dog served as a bridge between the counsellor and student. The therapy dog was reported to enhance the relationship, providing a safe, non-verbal experience for them, and students reacted positively to this. Study 16 also found the therapy dog enhanced the profile of the counsellor by demystifying them to the student. According to these authors, the counsellor became more real through the therapy dog, like a ‘celebrity’, and there was less stigma attached to students seeking support [16]. The enhanced therapeutic alliance facilitated by therapy dogs resulted in several studies discussing students increased disclosure during sessions [2,13,16].

The development of rapport between counsellor or teacher and student facilitated by a therapy dog encouraged students to share their vulnerabilities and concerns, according to studies 13 and 16. Studies 2 and 13 discussed how the physical and emotional affection displayed by the therapy dog made students feel secure enough to discuss their difficulties with their teacher or counsellor. Study 16 specifically discussed how the therapy dog was ‘transformative’ in prompting students to talk significantly more than when there was no therapy dog present. The counsellor perceived that students felt safe through touching the therapy dog and were able to express things they had not shared in previous sessions.

**Theme 5: Stress Reduction.** Prior research has established the importance of stress management in the context of learning. When students are overwhelmed by stress, their ability to focus, concentrate, and absorb information is compromised (Pascoe, Hetrick, & Parker, 2020). Features of CAT facilitating stress and anxiety reduction in students was a strong theme that

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arose from multiple articles. Studies 4 and 22 provided quantitative evidence on the reduction of stress and anxiety in adolescents during stressful study and exam periods, and during post-sessions with a therapy dog. Participants showed statistically substantial reductions in systolic and diastolic blood pressure and state anxiety inventory scale readings, with 65% of participants exhibiting a statistically significant reliable change [22].

Blood pressure, heart rate readings, cortisol levels, the Perceived Stress Scale (PSS) and the Visual Analogue Scale (VAS) mood rating were implemented in study 4 on adolescents receiving CAT during stressful assessment periods. Results supported interactions with therapy dogs moderated stress during exam time. Reductions in salivary cortisol, along with student perceptions that their stress and anxiety levels decreased, were noteworthy.

Stress and anxiety levels among students diagnosed with ASD after CAT were similarly discussed by a number of studies [8,9,14,15,18]. For example, study 9 reported post-CAT reductions in stress and anxiety symptoms in students diagnosed with both ASD and ADHD. Previous research had outlined the social complexities, sensory overload and difficulties with changes in routine, often associated with ASD, that can be a source of stress and anxiety in a school environment (Syriopoulou-Delli et al., 2019). Study 18 recounted an occasion where a student was anxious and upset as he had not been picked up at school to go home. ‘Minty’, the school therapy dog, calmed the student while waiting.

Study 22 identified a number of features of CAT that may explain the reduction of stress and anxiety levels in students. Interactions including petting, or other physical contact, may be a factor. A number of studies similarly discussed the ability of a therapy dog to act as a social or emotional buffer, with the ability to moderate physiological responses to stress [4,9,15,18,22]. Unconditional positive regard, comfort and affection were some of the characteristics of CAT purported to facilitate stress and anxiety reduction [2,11,14].

The ability of a therapy dog to enhance a student’s mood was identified as an important feature for the reduction of stress and anxiety in studies 1, 12, 13, 18, 19, and 22. In a case study, authors of study 12 considered how CAT promotes social and emotional capabilities, improves mood, and reduces stress. A student in that study discussed how therapy dogs can improve people’s mood: “If someone is sad and you see a dog, you’re happy...cause dogs are always happy...all the time”. According to these authors, student regulation skills, mood and confidence improve when a bond develops with a school therapy dog. A number of studies supported the mood enhancer qualities of a therapy dog and how these fostered a positive, cheerful and supportive learning environment [1,12,18].

A therapy dog can also act as a positive distractor in a number of ways, according to the authors of studies 1 and 18, by providing a diversion to students during moments of heightened stress or anxiety, or in times of sadness. Study 18 discussed an incidence where students were drawn to the therapy dog and displayed decreased anxiety and arousal. The dogs calming nature allowed good discussion time and focus for students. Additionally, some studies identified a therapy dog’s ability to distract students from difficult social interactions, and the demands of school work, by the creation of anticipation, a welcome break, social buffer, morale boost and the delivery of comfort and support [3,11,14,18]. The authors of study 11 concluded that preliminary evidence suggests therapy dogs could act as a positive distraction to the many stressors associated for students in a school environment.

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**Theme 6: Meeting Individual Student Needs.** The importance of a program that can meet the individual needs of students was a recurrent theme observed in several studies [3,8,11,12]. Studies 3 and 11 specifically concluded CAT had the kind of flexibility suited to education, social and psychological support programs. Study 11 made the distinguishing point that classroom therapy dogs were not service dogs; the relationship was more casual, with broader goals, the liberty to roam around a classroom, and the freedom to adapt to the needs of individuals or groups of students whenever it was required. The authors of study 3 discussed the increasing need for ‘unconventional methods of learning’ or ‘alternative education provisions’ that met the individual needs of students with complex challenges.

Accordingly, inclusive education should allow access to tailor-made programs based on student-centred learning [3]. Various CAT programs were examined and a number of studies reported CAT fostered a sense of inclusivity and equity within the educational system, enriching the landscape as a whole [3,8,11,12]. For example, study 11 recounted steps essential for the successful implementation of CAT programs into schools and suggested that for the program to be flexible enough to meet individual student needs, the whole school needed to be ‘on-board’. In order to meet individual student needs, several studies concluded that the security and comfort student acquire through CAT facilitate this process of inclusivity and acceptance [3,4,6,11,14].

The sense of security, comfort and support provided by a therapy dog facilitated the connection to a learning task or to an adult, according to study 4. These authors described the comfort and support as situational, a complementary intervention that was specific to each individual student. Study 6 investigated student perceptions of CAT, with one student saying when school work is hard, she feels that someone is right by her side. When discussing participant reflections, study 14 revealed that perceptions of CAT entail views, such as the presence of non-judgmental and non-verbal communicators, which characterise individual security and comfort in a school environment.

Studies 2 and 11 examined the physical and emotional comfort a therapy dog provided individual students and explored how this comfort and companionship facilitated student learning. A number of studies suggested the calming presence, physical affection, and emotional intuitiveness of therapy dogs created a safe space which fostered a more positive educational experience [3,4,6,11,14]. The flexibility of CAT, along with how program can be tailored to individuals, small groups and schools, was a feature discussed to some degree in all the studies.

However, a number of studies focused on one-on-one interventions, where specific measurable goals were discussed [4,8,9,11,14]. For example, study 21 explored the flexibility of CAT from targeting student learning needs in the classroom to assisting counsellors providing regular, structured and tailored interventions for students with mental health concerns. Parents’ perceptions investigated in study 14 reported how CAT sessions could be tailored to meet individual student interests and needs, if required. Study 11 also reported therapy dogs could be integrated into a wide range of therapeutic activities, making the potential intervention versatile and adaptable. Several studies pointed out that CAT may not be a replacement to other interventions, but it did have unique features that could be tailored to meet individual needs and provided a sense of security and comfort thereby rendering an intervention more effective than other approaches [3,7,8,10,11,12,29].

## Canine-Assisted Therapy and Autism Spectrum Disorder in Secondary Schools: An Integrative Literature Review

### DISCUSSION

This ILR incorporated literature from diverse methodological sources, allowing a broader and more comprehensive understanding of the phenomenon in a secondary school setting than would otherwise have been the case from a systematic literature review (SLR) or scoping review (SR) (Whitmore & Knafl, 2005). Innovative, novel interventions that meet the teaching and learning needs of diverse multi-characteristic students and educational settings call for a comprehensive, nuanced understanding of CAT and its potential benefits. To capture these multifaceted implications and insights from the literature, a holistic and integrative thematic approach was the necessary approach.

Secondary schools are characterised by the challenging and diverse nature of student cohorts, with students undergoing a critical phase of personal, social and academic development. Additionally, inclusive education presents a unique set of challenges for educators, as schools strive to create supportive environments that cater to the multidimensional exceptionalities needs of all students. Recognising and addressing these obstacles requires an approach that incorporates not only academic support but also mental health services, counselling, and programs designed to enhance social and emotional learning. This heterogeneity necessitates a perspective to instruction, intervention and counselling that is convivial, engaging and stigma free (Jones et al., 2019).

To better understand CAT and student learning outcomes in an inclusive secondary school setting the following two research questions were posed: RQ1—What themes emerge from the literature on CAT when it is used with secondary school students; and RQ2—What specific themes of CAT emerge from the research literature on anxiety in adolescents, in particular for secondary students diagnosed with ASD?

The questions sought to establish a platform from which broad findings across multiple studies were collected, and meaningful and relevant concepts within the data were identified. The study identified six recurring themes, each with two sub-themes. These rich insights about CAT and secondary students deepens knowledge and can inform future policy and practice, and therefore this discussion examines the overarching themes to emerge based on these two guiding questions.

Student well-being, school engagement, social connection, positive student-staff relationships and stress reduction were dominant emergent themes. These themes addressed secondary students needs and suggested possible encouraging outcomes of CAT in a secondary school setting. The sub-themes of happiness, calmness, motivation, confidence and rapport were underpinned by CAT features of being non-judgemental, offering unconditional support and love, and facilitators of social connectiveness. These findings concur with prior research from Fine (2019), Maharaj (2016), and Sheckler (2017) who noted that CAT was an effective tool to assist with rapport building and engagement. Furthermore, O’Haire (2013), Yap et al. (2016), and Wohlfarth et al. (2014), endorsed CAT as a non-judgmental intervention which was supportive and facilitated social interaction. These features perhaps at least partially explain the acceptability and effectiveness of CAT in a school environment.

The results of this review emphasise a number of interconnecting themes and sub-themes that significantly improve symptoms of student anxiety. Canine-assisted therapy contribute to stress reduction through mood enhancement or as a distraction from anxious thoughts or stressful situations. Quantitative results showed statistically reduced salivary cortisol levels and blood



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pressure, and heart rate of students at post-CAT interaction. All three measures are reliable markers of stress reduction in children.

Qualitative results described participants feelings of trust, comfort, security, non-demanding and unconditional affection as anxiety-reducing characteristics of CAT. Increased social connection facilitated by a therapy dog, happiness and calmness during class CAT sessions, and security and comfort post-CAT interactions were consistent, recurrent themes with sub-themes that promoted student well-being and mitigated anxiety symptoms.

According to these results, the presence of a therapy dog also enhanced the student-school counsellor relationship. In a secondary school setting, a positive therapeutic relationship increases rapport, encourages disclosure, and promotes retention in therapy sessions. These findings are consistent with Zents' (2017) earlier research, which found these types of interventions help overcome the potential stigma associated with seeking mental health support in a secondary school setting. Fine (2019), Maharaj (2016), and Sheckler (2017), reported the presence of an animal, in particular a therapy dog, makes counsellors seem more trustworthy, reducing feelings of stress and anxiety, increasing rapport and encouraging participation.

The ability for CAT to meet individual student needs was also an important finding when addressing student anxiety, including students diagnosed with ASD and comorbid anxiety. The ability for CAT to be a formalised intervention with specific goals while in a counselling session provided the opportunity for one-on-one support, tailored to the student's individual needs. The flexibility of CAT also offered the opportunity for less formal interventions and interactions to reduce anxiety symptoms. Playful interactions with a therapy dog during exam periods produced a reduction in stress and anxiety symptoms. Characteristics of comfort and affection through petting or other physical contact, and the unconditional positive regard from the therapy dog, were thought to be important factors in this nexus. This finding is consistent with Collier et al. (2022) who suggested an underlying notion behind the importance of CAT is a belief that animals are beneficial and calming to humans.

An important finding of this review relates to the impact of CAT interventions for secondary students diagnosed with ASD. Rich recurrent themes emerged which advocate CAT as an effective intervention and support for reducing symptoms of autism. This finding is significant when the growing number of multi-characteristic enrolments is considered in many schools, a large number of whom are diagnosed with ASD. Previous research has demonstrated the need for effective supports and interventions for students diagnosed with ASD (Christopher & Lord, 2022). Overall communication challenges, social skills deficits, inflexibility in behaviour and thought, problems with emotional regulation and comorbid anxiety are common barriers that can impact access to and participation in school life (Christopher & Lord, 2022; Lyons, Capadocia, & Weiss, 2011). Thus, any intervention which can lower these barriers should be welcomed.

According to the results, the overarching themes of social connections, student engagement, student well-being, stress reduction and meeting individual needs are features of CAT that positively impact learning outcomes and inclusivity for students diagnosed with ASD. Specific features of therapy dog interactions were noted in the results, as reported by Germone et al. (2019), with quantitative findings identifying more smiling, more laughing, and more positive vocalisations in students diagnosed with ASD. These findings collectively acknowledge CAT as facilitating more meaningful connections for students diagnosed with ASD. Descriptions of

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therapy dogs acting as a ‘social catalyst’ [11], ‘social lubricant’ [12] or ‘social buffers’ [9] were common threads throughout the results.

Additionally, Baird et al. (2023) described therapy dogs helped model concentration and calmness for neurodiverse students. Flynn et al. (2020) and Wintermantel and Grové (2022) in particular reported the presence of a therapy dog was a factor in getting students ‘unstuck’ with tasks and helping them become more cooperative, while London et al. (2020) noted therapy dogs assisted with motivation to complete non-preferred tasks. Moreover, improved self-regulation, increased evidence of empathy, and learning voice control post-CAT interventions were consistently observed in the data [e.g., 17,20]. Past research that targeted CAT and ASD (Hardy & Western, 2020; O’Haire, 2013; Petrina et al., 2014) support these conclusions. The sub-theme of tailored programs was an important component of CAT for supporting students with diverse needs, including students diagnosed with Level 1 ASD. The flexibility of CAT to provide one-on-one specific goal-measured interventions to a relaxed therapy dog interaction is an important finding and one that supports possible implementation into a secondary school setting [11] where programs with the flexibility to meet individual student needs are highly valued.

The methodologies of these peer-reviewed papers were not rigorously analysed for quality as would have been the case in a SLR; the purpose of this research rather was to construct a deeper understanding of the phenomenon of CAT. The integration of diverse methodologies and viewpoints, thereby created a rich tapestry from which themes and sub-themes were identified within the data. These results tentatively support the implementation of CAT programs or the inclusion of a permanent therapy dog in a secondary school setting.

### ***Limitations of the Study***

In this ILR, a literature search was conducted in four databases, Google Scholar, and a hand search of journals and reference sections. The searches covered both health and education databases. Initial broad and inclusive search terms were used to capture the scope of terminology used within CAT. However, an extended search in more databases and with additional search terms could have resulted in finding an even larger number of relevant studies. The potential for subjectivity within the sources poses another possible limitation. Inclusion and exclusion criteria were adhered to with precision throughout the screening process; nevertheless, a number of full text articles were not deemed relevant to the research topic and excluded. The ability to complete the final screening process solely through an objective lens was challenging. Notably, the studies engaged voluntary participants who consented to be involved in interventions or programs that included canines. This may have resulted in self-selection bias and personal predilections where results are only generalisable to participants who liked canines and would readily consent to engage with or utilise them in an intervention.

### ***Recommendations for Future Research***

While the results of this study provide a deeper understanding of the phenomenon of CAT and deliver rich results for enlightening secondary school teachers and leaders about the promising benefits of implementing a therapy dog program, there is the opportunity and requirement for additional research. Firstly, the dearth of literature investigating CAT in a secondary school setting provides a gap for future researchers to fill. Secondly, rigorous methodological quantitative and qualitative studies that can be linked more directly to well-developed theories and theoretical frameworks are required. Finally, there is a clear need for specificity of

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interventions that address procedures and processes to facilitate program implementation into secondary schools.

### CONCLUSION

The aim of this ILR was to investigate CAT in a secondary school setting. The increasing diversification of schools, for example in Australia, presents educators and policy makers with a challenge to develop and implement innovative, effective teaching and learning strategies, together with flexible interventions necessary to meet individual student needs. Alternative, novel ways of supporting multifaceted student profiles are worthwhile subjects of future research, in recognition that traditional methods may not adequately address these complex emerging needs. The findings from this research tentatively endorse the use of CAT in a secondary school to support adolescent mental health and improve symptoms of ASD by facilitating social interactions, reducing stress and providing non-judgemental support. These results are consistent with, but extend, prior research and the theoretical frameworks linking CAT to student learning.

The goal of this research was to gain a deeper understanding of CAT and its complexities in the context of secondary education. The rich themes that emerged are valuable in understanding the dynamic impact CAT interventions can have on individual students or whole school communities. Even though research on CAT indicates improved learning outcomes, further research is needed to better understand the challenges of program implementation and possible barriers that may affect these outcomes. Nevertheless, this research suggests that preliminary findings investigating CAT offer secondary school communities the opportunity for an enriched educational landscape beyond conventional approaches.

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