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Animal-assisted Interventions in Students of Primary Schools

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Abstract

Animal-Assisted Interventions (AAIs) have gained increasing attention for their potential benefits in primary school education. This review explores existing literature on the use of animals—particularly dogs, rabbits, and guinea pigs—in classroom settings with typically developing children, focusing on their influence on academic skills, emotional well-being, social behavior, and stress reduction. The selected studies were included based on criteria including in-classroom implementation and relevance to general primary school populations. Findings reveal that animals act as powerful motivators for learning and emotional support. Programs such as Reading Education Assistance Dogs (R.E.A.D.) show consistent improvements in reading comprehension and engagement, particularly among students with learning difficulties. Emotional and social benefits were also evident; students participating in canine-assisted education demonstrated enhanced emotional comprehension, while classroom dynamics improved with reductions in aggression and hyperactivity. Furthermore, interventions with animals significantly reduced stress markers like cortisol and alleviated state and trait anxiety—especially in transitional phases such as the preschool-to-school shift. Despite these promising results, methodological limitations—such as small sample sizes, lack of standardization, and minimal consideration for animal welfare—highlight the need for further research. Future studies should adopt rigorous, longitudinal designs and explore the mechanisms behind AAIs' effectiveness. Cross-cultural research, ethical guidelines, and integration into school curricula are also recommended. In conclusion, AAIs offer a promising, multidimensional approach to enhancing child development in primary education. With more robust evidence and ethical implementation, AAIs could become a valuable component of inclusive and supportive learning environments.

Keywords: Animal-Assisted Interventions (AAI), Primary Education, Emotional Development, Reading Comprehension, Stress Reduction

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Introduction

It is highly accepted by numerous studies over the last years that the animal assisted interventions (AAI) in students of primary schools has a positive effect on them in many ways. The interventions are based in the recognition of the human-animal bond and the possible benefits of this bond in human health. The interventions are distinguished in animal assisted activities (AAA), animal – assisted education (AAE) and animal- assisted therapy(AAT) [1].

Children aged 7-10 years old were asked to put a list of ten most important persons in their life and 2 pet animals were put in this list [2]. According to Odendaal and Meintjes (2003), animals have a calming effect on humans and lead to a reduction in the stimulation of the sympathetic system [3]. The interaction between the children and the animals (Human-animal interactions-HAI), on physiological measures of wellbeing has positive effect, as decreases the cortisol levels and the blood pressure and increases the oxytocin production. Therefore the AAI can be a stress and anxiety reliever for the students [4] and the two-way interaction can be beneficial for dogs and humans too [3]. The idea that the presence or interaction with animals reduces anxiety and arousal is also prevalent in the literature related to AAT [3, 5, 6].

Many primary schools internationally use this type of intervention especially in schools for special education, for example with children with Autism Spectrum Disorder (ASD), attention deficit disorder and other disabilities and in elementary school. Many types of animals have been used, like dogs, guinea pigs, horses, rabbits, even farm animals [7]. Children perceive the animals as a non-judgmental companion and this relationship can be very supportive, emotionally and

socially, especially in the "stressful" educational environment [8]. Trained-dogs are the most common used animal in AAI, due to the availability and trainability. Their behavior is almost predictable and it is no coincidence that the dog is human's oldest companion [9].

Methods

A search for information was conducted for the period from February to March 2025, utilizing Elsevier Science Direct, PubMed/ Medline and Google Scholar search engine. The terms "animal assisted interventions", "primary school", "education", "dog" were used as key words. From the resulting documents, those referring to typical primary school students, not in special education schools, were selected. In addition, only the articles where the intervention took place within the classroom were included.

Results

Included studies are presented in table 1. The animals in the life of primary school children are very special. Animals can be used as an important educational tool. Children can learn about life, death, reproduction, and biological processes through first-hand observation of animals [10]. However, the most important contribution of animals in an educational context is that they often function as a motivator for learning. Many studies have shown that animals within the school context can be a motivator and contribute to increasing students' participation and interest in engaging in educational activities [11, 12].

The role of animals in teaching and skill development is also important [13-15]. Perhaps the most notable example is the reading practice programs that have been developed in various countries. The program Reading Education Assistance Dogs (R.E.A.D.) helped children with reading problems to improve their reading skills and to decrease their fears, through the companionship of a specially trained dog [13]. Le Roux, Swartz, and Swartz (2014) used a dog in their randomized trial with children aged 7-13 years (N=102) who have been characterized as poor readers and investigated whether the presence of the animal effected on reading rate and comprehension. After a ten-week intervention the reading comprehension of the students has increased, but not all reading skills [16]. The same results concluded by Bassette and Taber-Doughty (2013), but both underline that more research is needed [17]. Treat (2013) used a therapy dog on children with Identified Learning Disabilities and examined the effect of the intervention into Guided Oral Reading Sessions. The intervention showed improvement in the group of children, where the dog has been used but further analysis is required [18].

Other researchers focused in the social-emotional stability and learning of students and the impact of the presence of a dog. Anderson and Olson used an untrained dog with children aged 6-11 years who had severe emotional disabilities. The presence of the animals had positive effect on the social-emotional stability and learning of the pupils [19]. Additionally, Scandurra et al. (2021) used a canine-assisted intervention in children 6-7 years old. The children showed improvement in their emotion comprehension compared with the other group of children which didn't have the companion animal [20]. According to Sagone and De Caroli (2013) emotional comprehension is a central component of children's socio-empotional competence, theory of mind and prosocial behavior from infancy to adolescence [21].

Additionally, other studies focus on the effect of the animal on classroom behavior. Kotrschal and Ortbauer (2003) [22], and Hergovich et al. (2002) [23], used dogs in classes with children aged 6-7 years of multi-ethnic background. Both studies reported that the intervention helped the homogeneity of the classroom and decreased the aggression and the hyperactivity of the pupils. In addition O'Haire et al. (2015) used guinea pigs in primary school children and the intervention showed that the children who participated had improved in social functioning and had minimized the problem behaviors [24]. An intervention to a third grade class (8-9 years old), following the Federico II Model for Pet Therapy, with a team consisted by a psychologist, a veterinarian and four animals (one dog and three donkeys), helped the children to recognize and understand primary emotion as joy, fear, surprise etc and to develop relational skills. The Federico II Model for Pet Therapy is a scientific model for Animal Assisted Intervention, based on Human–Animal Interaction and the core of this model is the Complexity Theory [25].

Cortisol is a hormone, which normally increases at times of stress [26]. Beetz et al (2011) measured the effect of a real dog, a toy dog and friendly person on insecurely attached male children of 7-12 years old, during a stressful activity. The children in the real dog condition showed lower levels of cortisol [27]. Similar results as in the research of Meints et al. (2022) who measured the salivary cortisol in children aged 8-9 years old, with and without special education needs, after a canine-assisted intervention [28].

Animal-assisted intervention with a special therapy rabbit has recently been used in first grade children in Hungary so as to support the preschool-to-school transition. The intervention showed decrease in anxiety levels, trait and state anxiety, for all the students and especially for those with higher anxiety levels [29]. Molnar et al. (2020) used also rabbits in their study so as to reduce the anxiety of first-grade students at primary school. The students showed decrease in their state anxiety and overall the intervention improved the efficacy of the educational ability of teachers [30] (Table 1).

Discussion

The body of research reviewed demonstrates a growing consensus on the multifaceted benefits of animal-assisted interventions (AAIs) in primary education settings. These studies span various objectives, including academic skill development, emotional regulation, social behavior, and physiological stress responses, each offering valuable insights into how animals can be integrated into educational frameworks (Table 2).

Academic Skill Development

Multiple studies highlight the positive influence of animals—particularly dogs—on literacy skills among young learners. For instance, the R.E.A.D. program [13, 14] and subsequent structured interventions [16-18] consistently reported improvements in reading comprehension, motivation, and academic engagement. While Le Roux et al. (2014) [16] and Treat (2013) [18] noted improvements in reading comprehension and oral fluency, they also cautioned that not all reading-related skills showed gains, underlining the need for further investigation. Importantly, these interventions seem particularly effective among students with learning difficulties or low engagement, suggesting animals can serve as both emotional and cognitive scaffolds in learning processes.

Emotional and Social Development

Several studies underscore the importance of AAIs in promoting

Table 1: Included studies in alphabetical order.

Authors	Methods	Results
Anderson & Olson (2006)	Case study with untrained dog and children with severe emotional disabilities	Presence of dog improved social-emotional stability and learning.
Bassette & Taber-Doughty (2013)	Single-case design with children with emotional/behavioral disabilities	Dog reading visits improved academic engagement; further research needed.
Beetz et al. (2011)	Stress test with insecurely attached boys (real dog vs toy dog vs friendly person)	Real dog group showed lowest cortisol levels (reduced stress).
Bueche (2003)	Description of the R.E.A.D. program (therapy dogs for reading)	Helped children with reading difficulties improve reading skills and reduce fear.
Dice et al. (2017)	Applied the Federico II Pet Therapy Model with psychologist, vet, dog, and donkeys	Helped children recognize basic emotions and build relational skills.
Esteves & Stokes (2008)	Observational study with children with disabilities	The presence of dogs improved social interactions in children.
Hergovich et al. (2002)	Intervention in multi-ethnic classroom with dogs	Dog improved classroom behavior and reduced conflict.
Iváncsik et al. (2025)	Intervention with therapy rabbit in first-grade children	Decrease in both trait and state anxiety, especially in highly anxious children.
Kotrschal & Ortbauer (2003)	Study in multi-ethnic classrooms with children aged 6–7	Dog reduced aggression and hyperactivity; improved class cohesion.
Le Roux, Swartz & Swartz (2014)	RCT with 102 children aged 7–13 years	Dog-assisted reading improved comprehension (not all skills).
Martin & Farnum (2002)	Study on AAT for children with developmental disorders	Animals increased student participation and motivation.
Meints et al. (2022)	RCT measuring cortisol in children with and without SEN	Dog-assisted group showed reduced cortisol (lower stress).
Molnár et al. (2020)	Used rabbits to reduce anxiety in first-grade students	Decreased state anxiety and improved teaching efficacy.
Myers (2007)	Theoretical work on child-animal connection	Animals help children understand life, death, reproduction, etc.
Newlin (2003)	Report on “Paws for Reading” program	Dogs helped children become more confident and engaged readers.
O’Haire et al. (2015)	Guinea pig classroom intervention	Improved social functioning and reduced behavioral problems.
Prothmann et al. (2009)	Study with children with autism and responsiveness to animals	Animals increased engagement and motivation in learning.
Sagone & De Caroli (2013)	Literature review on emotional development	Emotional comprehension is key to socio-emotional skills.
Scandurra et al. (2021)	Canine-assisted education for children aged 6–7	Intervention group improved in emotion comprehension.
Treat (2013)	Therapy dog in guided oral reading for students with learning disabilities	Group with dog improved; more research needed.

emotional understanding and social-emotional stability. Scandurra et al. (2021), using the Federico II Model, demonstrated improvements in emotional comprehension among primary school students following a dog-assisted intervention [20]. This aligns with broader theoretical frameworks, such as that presented by Sagone & De Caroli (2013), emphasizing emotional comprehension as foundational to prosocial behavior and theory of mind [21]. Additionally, Anderson & Olson [19], as well as Kotrschal & Ortbauer (2003) [22] and Hergovich et al. (2002) [23] provided compelling evidence that the presence of dogs can improve classroom dynamics by reducing hyperactivity and aggression, and promoting a more inclusive and cohesive learning environment, especially in ethnically diverse classrooms.

Stress and Anxiety Reduction

Biological markers of stress, such as cortisol, offer a concrete measure of the calming effects animals can have on children. Both Beetz et al. (2011) [27] and Meints et al. (2022) [28] found that children in animal-assisted conditions (especially with real dogs) exhibited lower cortisol levels compared to control groups, indicating reduced physiological stress. Notably, Meints et al. observed these benefits in children both with and without special educational needs, expanding the potential applicability of AAIs.

Complementing this, studies using rabbits [29, 30] showed reductions in both trait and state anxiety in first-grade students, particularly during transitional educational phases, such as the move from preschool to primary school. These findings support the view that AAIs can serve as buffers during critical developmental stages.

Motivation and Engagement

Other studies [11, 12] found that animals can act as motivators for children, especially those with developmental disorders. Their presence increases attention and willingness to engage with learning materials. Myers (2007) [10] and Esteves & Stokes (2008) [15] further argue that interaction with animals supports deeper social connections and engagement, even in children with disabilities.

Most, but not all, of the researches showed the beneficiary effect of these intervention within the classroom of primary schools. The review included, not only typical developing children, but also students with different characteristics, like emotional, learning, behavioral difficulties. The majority of the papers reported positive findings from the Animal-Assisted interventions but further research is needed. For instance, it is important to understand how the familiarization between the students and the trained-therapy animal can have more therapeutic effects and whether the bond between a dog and the child can alter the intervention. In addition, it is noted that there is a lack of reference to animal welfare and risk assessment [4] (Table 2).

Conclusion and Recommendations for Future Research

The collective findings from this diverse body of literature strongly support the integration of Animal-Assisted Interventions (AAIs) within primary educational settings. The presence of animals—particularly dogs and, to a lesser extent, rabbits and guinea pigs—has demonstrated considerable benefits across cognitive, emotional, behavioral, and physiological domains for children. These

Table 2: Summary of Comparative Findings.

Theme	Positive Effects Observed	Studies
Academic Development	Improved reading skills, comprehension, and engagement	Bueche; Newlin; Le Roux et al.; Treat; Bassette & Taber-Doughty
Emotional Competence	Improved emotional comprehension and social-emotional stability	Scandurra et al.; Anderson & Olson; Dice et al.; Sagone & De Caroli;
Stress & Anxiety	Reduced cortisol levels, decreased anxiety (trait/state)	Beetz et al.; Meints et al.; Iváncsik et al.; Molnár et al.
Classroom Behavior	Reduced aggression, hyperactivity, and improved cohesion	Kotrschal & Ortbauer; Hergovich et al.; O'Haire et al.
Motivation	Increased interest and engagement in learning	Martin & Farnum; Prothmann et al.;Myers; Esteves & Stokes

interventions are especially impactful for students with learning difficulties, emotional or behavioral disorders, and elevated stress or anxiety levels.

A key strength across the reviewed studies is the **consistency of positive outcomes,** even though methodologies and intervention designs vary significantly. Academic benefits—most notably in reading motivation and comprehension—have been well-documented [13, 14, 18], while emotional and social gains are evident in both typically developing children and those with special needs [19, 20]. Notably, physiological evidence such as reductions in cortisol levels [27, 28] offers compelling support for the stress-reducing capacity of animals in school settings.

Despite the promising outcomes, several limitations and research gaps remain as follows.

Methodological Limitations

Many studies rely on small sample sizes (e.g., Bassette & Taber-Doughty, 2013), lack control groups, or use non-randomized designs, which limits the generalizability of findings. Furthermore, a significant portion of the research is observational or qualitative in nature, making it difficult to establish causal relationships. Future studies should aim to employ rigorous experimental or quasi-experimental designs, including longitudinal approaches, to better understand the long-term impact of AAIs on children's development.

Standardization of Interventions

There is currently no universally accepted protocol for implementing AAIs in schools. The type of animal, duration and frequency of sessions, level of training for both animals and handlers, and educational goals vary widely. Future research should focus on developing standardized, evidence-based intervention frameworks that are adaptable to different school environments and populations. Models like the Federico II Model [25] offer a promising structured approach that should be tested in more diverse contexts.

Animal Welfare and Ethical Considerations

While the studies focus primarily on the benefits to children, the wellbeing of animals involved in interventions is often overlooked. Future research should incorporate measures that monitor animal stress and behavior to ensure ethical practices in AAI. This includes exploring optimal working hours, rest periods, and best practices for handler training.

Cross-Cultural and Inclusive Research

Most existing research has been conducted in Western or high-income settings. There is a critical need for cross-cultural studies that explore how AAIs function in varied sociocultural contexts, especially in under-resourced or multi-ethnic classrooms where behavioral and emotional challenges may be compounded by language and cultural barriers [22]. Additionally, research should address inclusive education, assessing how AAIs may benefit children with different types of disabilities or mental health needs.

Mechanisms of Action

There is still limited understanding of why and how AAIs work. Are the observed improvements in reading skills a result of reduced anxiety, increased motivation, or enhanced focus? Are emotional gains due to the nonjudgmental presence of the animal, the increased oxytocin, or the child's relationship with the handler? Neurobiological and psychological studies, possibly incorporating brain imaging, hormonal analysis, or advanced behavioral tracking, would significantly enhance our understanding of the mechanisms at play.

Integration into Curriculum

Lastly, research should explore how AAIs can be integrated sustainably into school curricula without disrupting academic routines. Studies should investigate teacher training, curriculum design, interdisciplinary collaboration (e.g., with psychologists or veterinarians), and the cost-effectiveness of these programs.

Overall, animal-assisted interventions offer a powerful, multidimensional tool to support children's educational, emotional, and social development. As the evidence base grows, so too does the potential for schools to adopt these practices more systematically and ethically. By addressing the current research gaps—through rigorous design, standardization, ethical safeguarding, and inclusive applications—future research can pave the way for AAIs to become a recognized and respected element of holistic child development in education systems worldwide.

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