Dogs in Learning: An Implementation of Human-Canine Synergy in Education

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Authors' contributions

Author TK developed the concept and its application. Author KCK helped its formulation and the writing of the paper. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

This paper substantiates a holistic approach to the human-canine synergy for classroom use. It is suggested that at the interface between human needs and canine's response/role are combined the therapeutic abilities of the interaction concept (i.e., provide affection and comfort to children), the assistance skills of the relationship concept (i.e., perform specific tasks to aid children in their school life) and the determining capabilities of the bonding concept (becoming an instructional vehicle in teaching various subjects). Within this framework, the paper presents and elaborates a new educational approach termed Dogs in Learning (DIL). By using trained dogs, this approach helps students to achieve their educational objectives by performing a series of interaction, relationship and most importantly bonding activities. It is used in teaching the curriculum contents of the K-5 levels at the American Community School in Athens (ACS), which is applied by students in a meaningful and fun way.

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1. INTRODUCTION

In the 21st century, important changes have taken place in the way we view the human-canine synergy, resulting in a new approach in considering the role and use of dogs in schools. Basically, changes in the perception and implementation of the human-canine synergy provided by scientific knowledge and practicing experience [1,2,3] clearly indicate that a new holistic approach to dog utilization in schools needs to be utilized to have successful results. The goal of this paper is to substantiate that in using dogs to effectively and efficiently facilitate teaching and learning in our schools, the nature of the human-canine synergy has to be fully understood, because in turn it determines the way we utilize dogs in schools as well as how we implement it in real school conditions.
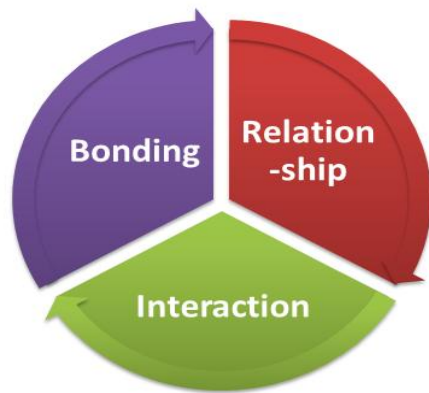
Fig. 1. Human-canine synergy forms

The position presented in this paper is simple in its explanation, but radical when is considered in terms of the existing beliefs and practices in the community concerned with dogs. Today's dog owners, trainers, breeders, academics, publishers of dog magazines and human society attendants as well as school teachers consider them as capable of exclusively providing either emotional, psychological and physical interactions to humans or the skill to build relationships that assist and help improve the quality of life of humans. However, we suggest and substantiate the notion that canines are in addition capable of being an effective bonding vehicle in facilitating or inspiring human activities, which is of paramount importance to education. That is, it is suggested that all canine capabilities (interaction, relationship and bonding), which in education they need to be combined and many times used simultaneously, cannot be dealt with
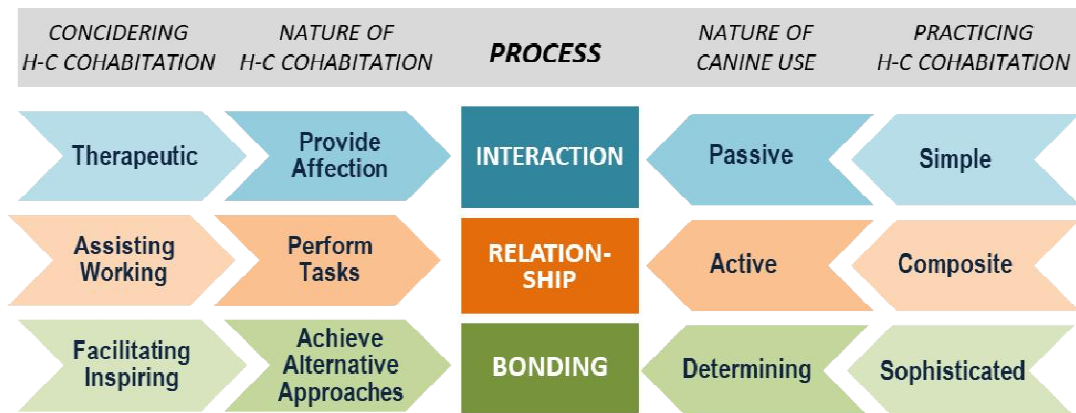
unless we accept the fact that they represent different manifestations of "a whole", the dialectic entity of human-canine synergy, which consists of three forms of human-canine synergy processes (Fig. 1).

2. THE HUMAN-CANINE SYNERGY EVOLUTION

The human-canine synergy concept has been studied and evolved since the late 1700's and continues up to now. More specifically, as early as 1792 in England a neurological clinic (actually an asylum) introduced caring for animals as a therapeutic approach to assist patients with psychological, anxiety and stress problems [4,5]. Thus, the concept of interaction between humans and canines was formulated and was related to a therapeutic framework, where canines provide affection and comfort to humans. In this way, the practice of the human-canine interaction has been a simple process creating a passive role for the canines in the human-canine synergy and has been and still is used extensively in our schools (i.e. Dogs as attentive reading listeners in the classroom) (Fig. 2, first row).

After WW2 the synergy concept of the interrelationship between humans and canines reached prominence and it was focused on dogs assisting or working for humans, where canines perform various tasks or help humans in various activities, including children's' education [6,7]. In this way, the practice of the human-canine relationship is a composite process, requiring canines to have an active role in the human-canine synergy. This approach has also been in use in our schools (Dogs helping students to achieve a task such as measuring a distance) (Fig. 2, second row).

Finally, the concept of human-canine bonding synergy has gained prominence in the 21st century, although the term was first introduced by Leo K. Bustad in a 1983 lecture. In this concept, the affiliation between humans and canines is focused on facilitating human activities or inspiring humans by becoming a tool in achieving alternative/nontraditional approaches in accomplishing their goals. In this way, the practice of the human-canine affiliation is a sophisticated process, which moulds canines into playing a determining role in the human-canine synergy (i.e. Dogs facilitating students' learning math principles) (Fig. 2, third row).

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CONCIDERING H-C COHABITATION	NATURE OF H-C COHABITATION	PROCESS	NATURE OF CANINE USE	PRACTICING H-C COHABITATION
Therapeutic	Provide Affection	INTERACTION	Passive	Simple
Assisting Working	Perform Tasks	RELATION-SHIP	Active	Composite
Facilitating Inspiring	Achieve Alternative Approaches	BONDING	Determining	Sophisticated

Fig. 2. Considering and practising human-canine Synergy

There is a rich literature on the issue of human-canine synergy, including a relevant to the paper resent extensive overview by Brelsford et al. [8], titled "Animal-Assisted Interventions in the Classroom—A Systematic Review". It should be pointed out, however, that the literature clearly shows a lack of concern for the bonding concept that this paper substantiates and applies for the first time and is examined next.

3. THE SYNERGY CONCEPT CHARACTERISTICS AS FACTORS IN TEACHING

The human-canine synergy as a mutually beneficial and dynamic affiliation between humans in general and children in particular and canines has been under examination for many years. In neurology research, a fundamental result has been that human-canine synergy can affect the release of various neurotransmitters in the brain [9]. Among the most important, are the increase in the levels of oxytocin (linked with need for such synergy: children and dogs love each other's company) and dopamine (involved in the reward/motivation system: children and dogs accept easier rewards from each other) and the decrease of the cortical levels (an immunosuppressant associated with stress: children are less stressful, especially when they have learning difficulties, in the presence of dogs [1,2]).

In addition, the human-canine synergy has been the focus of scientific efforts in other areas. The work of _Frisch and_Tinbergen, who received the Nobel Prize in Medicine in 1973, has been the most influential. Their discoveries concerning organization and elicitation of individual and social behaviour patterns in animals have been for all practical purposes the first scientific attempt and the basis of subsequent research on the human-canine interaction and relationship concepts. That work was reinforced by Levinson [10,11] who in his books "Pets and Human Development" and mainly "Pet-Oriented Child Psychotherapy" exemplified the principle of imprinting, which describes situations in which an animal or person learns the characteristics of some stimulus that is "imprinted" onto the subject (a very important teaching and learning tool). His work had an immense influence not only on confirming and securing two of the human-canine concepts (interaction and relationship) but most importantly in their use in teaching and learning.

Lately, there has been a proliferation of research dealing with different aspects of the human-animal synergy related to social work [12,13]; clinical psychology [14,15,16]; psychiatry [17]; nursing [18,19]; and psychotherapy [20,21]. All of them represent invaluable background knowledge in education. Finally, and most importantly, new research has shown that human-canine synergy exceeds the concepts of interaction and relationship and in order to successfully utilize canines in schools a holistic approach is required expressed as combination of the elements belonging to all forms of that synergy (interaction, relationship and bonding) [2,3].

In summary, canines are capable of being an effective tool in responding simultaneously to different forms and intents of educational needs and thus becoming a tool in achieving alternative/nontraditional approaches in accomplishing educational goals. For example, relationship activities can coexist with interactive

activities and support them (a dog helping a child in a school task, a relationship activity, can certainly provide affection and comfort to that child, an interaction activity), or bonding activities can coexist with interaction and relationship activities (a classroom dog helping pupils learn mathematics, a bonding activity, can guide them through a maze, a relationship activity, as well as help them nurture relationships, an interaction activity). A holistic approach in considering human-canine synergy is not a matter of choice, but imperative in successfully utilizing dogs in education.

4. THE DOGS IN LEARNING PROGRAM: APPLYING THE HUMAN-CANINE SYNERGY CONCEPTS

All the aspects of the human-canine synergy concepts presented previously can be clearly understood by the Dogs in Learning program. The program has been an integral part of the ACS Athens school curriculum since 2011 and continues up to now. It was devised and applied by Theo Koutsopoulos and his team. Mr Koutsopoulos, an ACS Athens faculty member and a certified dog educator, during his many years as a dog trainer, has introduced several innovative canine behaviour modification approaches.

The Dogs in Learning (DIL) is a program whose value and necessity are beyond the known types of dog utilization in schools. It introduces the classroom dog that is capable of being an efficient and effective tool in supporting all aspects of the human-canine synergy (assist children in applying the basics of human behaviour, achieve specific tasks and facilitate their learning in various educational subjects). The Dogs in Learning can be described as a program based on three interrelated pillars: the human-canine synergy practices; the academic framework; and the application approach. The program contributes through the three human-canine practices (interaction, relationship and bonding), in achieving an educational framework described by its principles and objectives, which in turn create an application approach offering four types of classroom benefits (academic, social, emotional and psychological) (Fig. 3).

4.1 Human-canine Synergy Practices

In the DiL program, all human-canine concepts were utilized in a real educational setting by providing the following:

4.1.1 Interaction contributions

Research on the interaction between children and animals has shown that it offers social, emotional, behavioural and physical benefits. It increases the contact between children and animals, fosters nurturing behaviour, increases their social skills and reduces the physiological impact on their health in areas such as: lowering blood pressure, reducing allergies and increasing relaxation [22,23]. The application of the DiL program at ACS has confirmed that within an academic environment, these benefits can be attained. Indeed, the program has shown that classroom dogs can perform extremely successfully on all those objectives by contributing as:

4.1.1.1 Classroom participants

The simple presence of dogs in the classroom, during daily classroom work, provides a calming effect on the children.

4.1.1.2 Listening audience

Classroom dogs, by allowing an individual child to read to them or participate in a book reading session of a group of children, provide benefits such as: improve reading levels as the child practices the skill of reading; increase positive self-esteem as the classroom dogs are not only attentive listeners, but mainly non-judgmental ones; motivate children to read because reading is associated with a fun activity: facilitate conversation and socialization because children interact with each other and the dog.

4.1.1.3 Reward providers

Given that classroom dogs are gentle, loving, and approachable, their very presence is a reward for the children.

4.1.1.4 Responsibility enhancers

Children learn to undertake responsibilities by providing food and water, walking, grooming, playing, and training for their classroom dog. This enables them to build their self-esteem by feeling needed and responsible for the benefit of another soul. In addition, practising these responsibilities encourages pro-social behaviours, while working within a group.

4.1.1.5 Social facilitators

By spending time with classroom dogs, children receive much joy and plenty of attention and
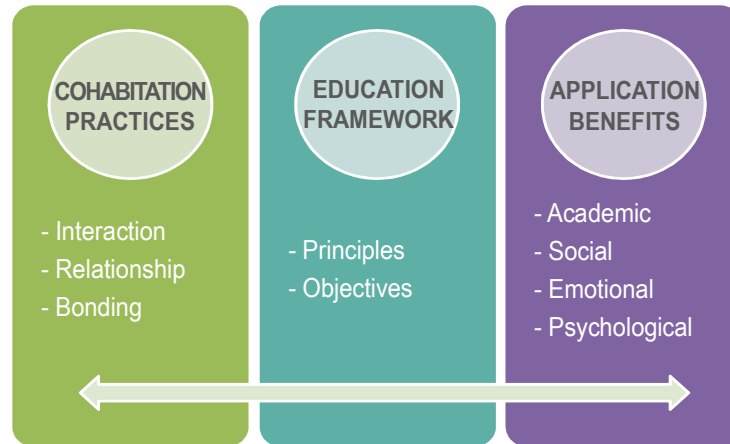
Fig. 3. The pillars of the dogs in learning program

affection from them. Most importantly, classroom dogs provide relief during anxious times and act as a friendly social ice-breaker. Their very presence diverts attention from a student to the dog, encouraging pro-social skills and dialogue. In summary, children who struggle with social interaction find reassuring friends in classroom dogs, which are great social facilitators.

4.1.1.6 Psychological supporters

Children work with classroom dogs on a one-to-one basis. As a result, children can be helped to overcome psychological conditions when: going through upsetting/difficult times or are scared/phobic of dogs; having low self-esteem and need to improve their self-image; needing to take more risks because they are reserved; and needing to improve morale, concentration, anxiety and hyperactivity.

4.1.1.7 Empathy providers

By identifying and relating to classroom dogs, children intrinsically learn to apply and manage their emotions in the way they treat other people. In addition, classroom dogs encourage a broad range of emotional states in children, including caring for other people and having a desire to help them; experiencing emotions that match another person's emotions; discerning what another person is thinking or feeling, and eliminating distinct differences between themselves and others.

4.1.2 Relationship contributions

The Dogs in Learning program has shown that classroom dogs, in addition to the previous interaction contributions, can apply the relationship concept mainly by contributing as activities assistants**.** Children using classroom dogs either as helpers in performing specific tasks (i.e., measuring a distance) or as assistants in educational activities (i.e., determining the coordinates of a point) are applying the relationship concept.

4.1.3 Bonding contributions

Finally, the Dogs in Learning program has shown that classroom dogs, in addition to the previous interaction and relationship contributions, can apply the bonding concept by contributing as education facilitators. Classroom dogs have shown that their most important contribution is that they can facilitate learning in many subjects (mathematics, biology, social studies, literacy and language development, etc.), to students having differentiated learning difficulties, using various learning approaches, and following as well as enhancing any desirable curriculum.

4.2 The Educational Framework

The literature has shown that school is a determining factor in children's development, by providing them with competences, nurturance and adjustment to the social environment [7] and at the same time protecting them from stress and dysfunction [24]. The six years application at ASC has shown that the use of classroom dogs is a viable schooling approach, achieving all these schooling benefits in a fun and enjoyable way. In essence, it represents an alternative educational framework determined by two factors: its principles and its approach.

4.2.1 Educational principles

The basic principles of the Dogs in Learning program are linked to the program's approach (resilience), its learning methodology (flexible learning), its learning facilitating mechanism (social and emotional learning), its fundamental concern (animal-loving sentiments) and its underlying behavioural concept (empathy). More specifically, the program is based on the following principles:

4.2.1.1 Resilience

This basic principle of the Dogs in Learning program promotes an integrating approach to education, which combines physical, cognitive, social and emotional aspects of learning. It exemplifies children's ability to face, adjust and adapt to various educational challenges with the help of classroom dogs. In the Dogs in Learning program, children are provided with answers to such fundamental questions as "Why is it important to learn a specific concept?" or "Where am I going to use this mathematical concept?", because these concepts are related to specific dog activities or behaviours, which have been observed, analyzed and understood by the students themselves.

4.2.1.2 Flexible learning

In the Dogs in Learning program, this principle promotes a flexible approach in terms of pace, time, place, and/or mode of learning delivery. It focuses on learning methodologies that exist in many forms that occur inside or outside the classroom, anytime and with the support of classroom dogs as a didactic instrument. As a result, the classroom dogs are utilized as instructional media that facilitate the process of teaching and learning. Students can observe the classroom dogs or their own dog, inside and outside the classroom or at home, in videos or simulations and they are asked to present and discuss their findings inside or outside the classroom. In addition, students do research by themselves or in groups and discuss meaningful and relevant questions to their life and to life in general.

4.2.1.3 Social-emotional learning

This principle applied by the Dogs in Learning program promotes a positive thinking learning mechanism, which is achieved through a series of actions and activities, utilizing classroom dogs, such as: coordinating thoughts and actions; enhancing critical thinking skills; encouraging responsible and ethical decisions; promoting healthy pro-social behavior; building character – enhancing academic achievement; building self-esteem; encouraging role-play; provide opportunities for fun educational activities.

4.2.1.4 Human-canine cohabitation

Within the Dogs in Learning program, this principle allows a holistic human-canine synergy approach, which leads to instilling a love for animals by promoting: responsible pet ownership; caring for dogs (provide: food, water, grooming, walking, playing and training); multi-dimensional, positive, hands-on experiences with dogs.

4.2.1.5 Empathy

This is the underlying behavioral concept in the Dogs in Learning program, which is based on dog behavior and treatment and leads into helping students to care about others and have a desire to help others; discern what another person is thinking or feeling; understand and connect to the emotions of another person; nurture relationships; and bring out the best of human behavior, feelings and emotions.

4.2.2 Educational objectives

Given that the Dogs in Learning program is addressing young children exposed to relatively complex concepts and requiring a progressive approach, its approach to learning inevitably leads to the application of the spiral curriculum method, which becomes simple and effective.

The Spiral Curriculum is a term coined by Bruner in 1960 and refers to a teaching and learning approach for young children. This well-known approach was based on Bruner's claim that "We begin with the hypothesis that any subject can be taught in some intellectually honest form to any child at any stage of development" [25]. That is, even the most complex teaching concepts, if properly structured and presented, can be learned by students at any age by allowing: students to be exposed to a topic, theme or subject several times throughout their school year and school career; the complexity of the topic, theme or subject to increase with every subsequent exposure; each exposure to be closely related to the previous one and the new knowledge to be within the context of the old one.

In this way, the information or knowledge is reinforced and solidified each time the student is exposed to the topic or subject. In addition, it encourages students to apply their previous knowledge to later course objectives, allowing a logical progression from simple to increasingly complex ideas at the same time.

The Dogs in Learning program, operating within the ACS K-5 curriculum, applied the spiral curriculum learning approach in the following interaction, relationship and bonding concepts:

4.2.2.1 Interaction concept

The key elements and their spiral position in applying the interaction concept, within the ACS curriculum and in a yearly educational cycle are 1st Grade: Patience; 2nd Grade: Patience-Confidence; 3rd Grade: Patience-Confidence-Focus; 4th Grade: Patience-Confidence-Focus-Team Work; and 5th Grade: Patience-Confidence-Focus-Team Work-Leadership. Using classroom dogs, the ACS students are taught a new element every year while repeating the elements of previous years in a more advanced manner, which illustrates the depth of knowledge.

4.2.2.2 Relationship concept

This concept is applied by asking students to utilize classroom dogs in helping them achieve various tasks, from simple to more substantive, and repeat them in a spiral manner as they advanced in their education.

4.2.2.3 Bonding concept

The bonding application is related to the teaching of many school subjects, but here only the teaching of mathematics and the spiral curriculum approach as they were applied in all classes of the ACS K-5 curriculum are presented. The example presented is from all classes, in a yearly educational cycle and on the subject of addition and subtraction (Table 1).

4.3 Application Benefits

It is common knowledge that teaching and learning have various benefits to pupils because the time they spend in school influences their experiences (life and learning), self-perceptions, and how one's life progresses [26]. Therefore, students in the school are inspired and empowered not only academically, the major

goal of teaching and learning, but also psychologically, socially and emotionally. In summary, in addition to acquiring knowledge and dexterities, students are becoming psychologically, socially and emotionally competent, which lead them to be happier, more confident and equipped with strong interpersonal skills across various contexts and roles.

The importance of psychological, social and emotional learning as an intrinsic aspect of children's academic learning and performance, has been clearly evident in the operation of the Dogs in Learning program. Indeed, the application of the program at ACS has shown the following benefits:

4.3.1 Psychological benefits

In a society where animal neglect is prevalent, the Dogs in Learning program by enabling students to care for, work with, and train classroom dogs, have helped students to exhibit a passion in what they do through compassion. Additionally, it has helped them realize that every action has a consequence and by understanding and accepting this attitude, it can lead into changing the way they feel about themselves and others, and thus build compassion, empathy, and respect.

4.3.2 Social benefits

Within the framework of the Dogs in Learning program, students learn the basics of animal handling, including how to properly approach and meet a dog; how to overcome dog phobias (if any); basic training commands (come, heel, sit, sit-stay and down-stay); responsible pet ownership, including walking, feeding, grooming, and playing with a dog; and understanding the basics of canine behavior. In this way, by participating in the program, students are educating themselves on how to incorporate the dogs into their daily lives, based upon understanding and respecting the various forms of human-canine synergy.

4.3.3 Emotional benefits

The children participating in the Dogs in Learning program have the opportunity to experience meaningful moments of synergy with classroom dogs. As they interact with and see the classroom dogs respond to their requests, their self-esteem is solidified. They also "develop" positive relationships, make good decisions, and

Table 1. Bonding applications in teaching mathematics

Grades	Curriculum	Dil activities
1st	**Add** and **Subtract** within 20 and fluently within 10.	Students are divided into teams. Each team is asked to guide the dog around a different number of dog obstacles (in a constructed for that purpose obstacle course), within a specific time period. In the end, the students have to mentally identify how many obstacles they had completed and how many were left?
2nd	**Fluently add and subtract within 20** (Mastery). The terminology includes "subtract from 10, less than, count on from, add to." .	By using the command "**come**" the dog has to begin walking from a set of points (marked with cones) in a straight line towards the student. With every cone, the dog passes in a straight line the student adds them. If the dog fails, it has to be directed to go to the previous point of the exercise and the student subtracts to find the difference. Children fluently "count on" from each cone the dog passes successfully and "subtract the difference" of these cones and from the total (20) on the walking course.
3rd	Students **add & Subtract up to 4-digit Numbers**.	Students are recording the distance, measured in cm, covered by two dogs in the treadmill. The dogs walk for a time period and stop to rest and the distance is recorded (in thousand cm). The process is repeated until the dog stops walking. Then the students add the distances walked by each dog in all time periods. Next, the students subtract the total distances covered by the two dogs to find the difference in the distance walked by them. In both cases, the numbers are written and read in both standard and expanded form. (i.e., 2356 as two thousand three hundred and fifty-six). Or 2　1000's 3　100's 5　10's 6　1's The adding algorithm is by adding distances for different time periods ($T_1 = t_1 + t_2 + t_3 ...$ and $T_{difference} = T_1 - T_2$)
4th	Students fluently **add** and **subtract multi-digit** whole **numbers.** Students will be able to understand that in a multi-digit whole number, a digit in the one's place represents ten times	All students are given the opportunity to walk the perimeter of the soccer field either by themselves or by leading the dog. Then they are divided into three groups **Team A** students are asked to write down the number of dog steps for every side of the field and add them. **Team B** students are asked to write down the number of student steps for every side of the field and add them.

	what it represents in the place to its right .	**Team C** students are asked to find the difference between student steps and dog steps for the perimeter of the field. All students are asked to express the result of their counting in numbers of 100's, 10's and 1's and recognize that the digit in one place represents ten times what it represents in the place to its right
5th	Students will use place value understanding of round decimals to any place .	Students will play the dog a relay exercise. Each team is asked to cover the same distance whereby each student runs a portion of the distance with the dog and gives it to the next student. The time elapsed by each student and the total of each team is counted using a stopwatch that can record second hundreds. Students are asked to round their time and their team's total time to the second tens and seconds. (i.e., 10.34 seconds &10.73 seconds are rounded to 10.3 seconds & 10.8 seconds and 6.83 seconds & 6.28 seconds are rounded to 7 & 6 seconds).

conduct their behaviour ethically and responsibly" [27] (Collaborative for Academic, Social and Emotional Learning, 2013).

4.3.4 Academic benefits

The major goal of the Dogs in Learning program is to provide educational benefits. In order to achieve this goal, the program has to be based on the same academic curriculum and have the same educational objectives as those applied by the school. The program utilizes well-trained classroom dogs and faculty who have experience in professional dog training and behaviour, which are not present in the traditional educational settings. However, its educational goals are exactly the same as those for the school, namely: focusing on enriching and enhancing student learning in a variety of subject areas. The Dogs in Learning program is simply an alternative teaching approach characterized by fun and joy. Some examples of the program's teaching activities, differentiated by the utilization of dogs, might clarify the issue.

4.3.4.1 Interaction

The elementary school children can be inspired to read aloud to their classroom dog on a daily basis. This act of reading aloud to a non-biased listener enables them to feel safe, while they are taking a risk (reading in front of the all the other children). First-grade students can be led to willingly write letters to their classroom dog and thus be inspired to be more communicative, compassionate, and involved. In the application of the program at ACS, both these activities achieved the status of a fan club (like the rest of the clubs of the school).

4.3.4.2 Relationship

Fifth-grade students are asked to find the perimeter and the area of the basketball court in cm when a long measuring tape is not available. Since they are aware of previous exercises that their classroom dog's step is equal to 32.2 cm, they can put the dog to walk along all sides of the court and count the number of steps. Using that information, they can solve the problem. In this way, the classroom dog assists the students in performing a specific task.

4.3.4.3 Bonding

The 4th-grade math curriculum demands that "students will be able to find all factor pairs for numbers 1-100". To teach that math concept, students are taken to the dog obstacle course. The obstacles are divided into three groups. The completion of an obstacle in each of these groups is worth 7, 8, and 9 points respectively. A student or a team of students is asked to choose any three obstacles and express the total number of points, after the completion of each obstacle, as a factor of a pair of whole numbers. For example: first obstacle 8 points = 2x4 points; second obstacle 7+8 points = 15 points = 3x5 points; and third obstacle 7+8+9 points = 24 points = 2x12 points or 3x8 = 24 points. In this way, the classroom dog provides students with an alternative approach to attain an educational objective.

In sum, the application of the DiL program, which represents the use of dogs in the classroom as a manifestation of a holistic approach to the human-canine synergy in a real educational setting, has been achieving its goals and objectives in a very successfully manner. Actually, the results of comparing "before and after" of the use of classroom dogs in learning achievements has been extremely positive. A proper presentation of these results, however, are outside the scope of this paper and their announcement require proper and extensive presentation to meet statistical requirements and be fit for a scientific journal. Suffice to point out that students, teachers and parents' responses to the DiL program indicate great satisfaction, coupled with significant increases in school registrations, because of the perceived validity, utility and popularity of the program.

5. CONCLUSIONS

Academic institutions now more than ever, have to provide new educational opportunities and experiences in order to transform their students' educational experience into social, economic, environmental, and intellectual resources and thus improve their lives [3]. The Dogs in Learning program represents such a new educational approach, because by using trained dogs, it provides: the psychological support of the human-canine synergy interaction concept (i.e., provides affection and comfort to students); the assistance skills of the human-canine synergy relationship concept (i.e., performs specific tasks to aid students); and the instructional capabilities of the human-canine synergy bonding concept (i.e., becomes an instructional vehicle in applying the curriculum contents to most curriculum subjects). All these can be accomplished more

effectively and in a playful and enjoyable manner, because students are directly engaged in the learning process and are provided with meaningful hands-on opportunities. Dogs, by virtue of being capable of attracting and holding the attention of children in the classroom (a very difficult task in traditional educational approaches), can inspire them, help them attain tasks, and facilitate their learning process.

However, the main contribution of the Dogs in Learning program is that through the presence and use of classroom dogs, a manifestation of a successful learning approach, the dialectic entity of the holistic human-canine synergy is attained. The program by contributing through three human-canine practices (interaction, relationship and bonding) is helping achieve an educational framework described by its principles and objectives, which is offering four types of classroom benefits (academic, social, emotional and psychological). But most importantly it internalizes the proposed concept of becoming a successful part of the innovative educational practices of ACS.

In closing, it is our strong belief and hope that the proposed approach will not only overcome some of the issues raised by Hosey & Melfi [28] in their literature review, but it will become an integral part of every educational system and its success at ACS will provide the impetus to establish the classroom dogs as a viable alternative to traditional educational approaches.

CONSENT

As per international standard or university standard, the patient's written consent has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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