



The Implementation Process of an Animal-Assisted Humane Education Programme in Hong Kong

Joe TK Ngai; Rose WM Yu; Kathy KY Chau; Jean CY Lee; Paul WC Wong*

Department of Social Work and Social Administration, The University of Hong Kong, Pokfulam, Hong Kong, China.

*Corresponding Author(s): Paul WC Wong

Department of Social Work and Social Administration, The University of Hong Kong, Pokfulam, Hong Kong, China.

Email: paulw@hku.hk

Abstract

Animal Assisted Education (AAE) is a burgeoning field of education. Increasing bodies of studies indicated the positive effect of social functioning, emotion stabilizing, physiological arousal of AAE in child education. However, the application of AAE faces two significant problems. First, interventions are rarely implemented as designed and, therefore, failed to achieve the intended learning outcomes. Second, no consensus has been reached among educators on standards of best practice, which means the practice of AAE varies and is unregulated. This paper aims to address these problems by elucidating the actual implementation of an AAE programme called Competence in Active Resilience for Kids (CARing Kids) in Hong Kong. Three researchers with psychology/social work/animal assisted therapy training developed and evaluated an CARing Kids in six primary schools. This paper illustrates the step-by-step process and strategies to ensure fidelity to the conceptual framework for achieving an effective AAE Programme and the welfare of the service animals are well protected.

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Keywords: Animal assisted education; Humane education; Implementation science; Animal welfare; Service canine; Social emotional learning; Canine companion reading; One health.

Introduction

The World Health Organization [1] predicted that around 70 percent of the world population will be living in an urbanized area by 2050. Although the rise of megacities has advanced the technologies, global economics, and provide human comfort, an increasing body of research indicated that extreme urbanization is related to pollution, reduced species richness, interpersonal tension, alienation from nature, rapid disease transmission and zoonosis [2-6]. Under the framework of the "One Health" concept, a positive human-animal-environment interface is essential for sustainable development of humanity. A meta-analysis indicated that connection with nature has a positive impact on mood, cognition, and health [7]. The "One Health Commission" recommended that engaging and educating communities on the "human-animal-environment interface"

are essential steps to promote the one health concept [8]. The Commission also emphasizes the promotion of knowledge and scientific understanding of the human-animal-environment interface, especially in secondary and college education [9]. Humane education is a form of character education that uses animal-related stories, lessons and activities to foster respect, kindness, and responsibility toward animals and humans. It is a building block toward a positive human-animal-environment interface [10]. We believed that early childhood education in cultivating humane attitudes is critical in developing a positive and empathetic attitude for all living things and in cultivating respect to the environment we live in. Early childhood humane education serves as a pivotal element to reduce the negative impact of urbanization in a rapidly growing human population.



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Animal Assisted Education (AAE) is a burgeoning field of education and is often intersected with humane education [11]. Research indicated that AAE could improve children's empathy, academic ability, emotional management, and social competences which are the foundations of pro-environmental behaviors and humane attitudes [12]. However, AAE often takes place in an unregulated manner, and no consensus has yet been reached among practitioners on acceptable best practice standards [13]. One of the core problems in advancing the robustness of AAE is the overemphasis on its positive impact. At the same time, the need for scientific ground in human-animal interaction is underplayed [14]. Media often likes to portrait a "magical image" of the healing effect of AAE. It gives a false perception to the public that the mere presence of an animal in the education setting would yield similar results compatible, or even better, to other carefully planned interventions. The ambiguity in the process with which AAE is implemented forms an obstacle to develop evidence-based practices.

The importance of implementation strategies in the school setting

Implementation plays a significant role in programme outcomes, level of implementation is positively correlated with at least half of the programme outcomes in the majority of studies in the prevention programme [15]. Increasing studies across disciplines indicated that interventions are rarely implemented as designed and, therefore, failed to achieve the intended outcomes or replicate the results documented in the research papers [16]. In the education setting, school teachers often did not have sufficient resources to replicate the rigorous experimental conditions in intervention efficacy evaluations. For example, randomized assignment allocation is often impossible in real-life education setting. Adaptation is required to modify the programme components to ensure feasibility in practitioners' working context. While adaptation is inevitable, the key to ensure both programme efficacy and effectiveness is achieving an equilibrium between adaptation and fidelity. Herrera-Sánchez, León-Pérez [17] suggested that implementation is a dynamic process of adapting the programme to the context of action while maintaining the intervention's core principles. Practitioners need to identify the core components of the programme that contributed to intended outcomes and determine the level of adaptation. Over-adaptation might trade off the efficacy of an intervention, while the intervention in a rut without practical consideration threatens the effectiveness of programme delivery. As such, implementation strategies to ensure the effectiveness in achieving the desired outcome are as important as the efficacy research from a practitioners' perspective.

Practical concern of the welfare of service animals in AAE

Animal welfare is essential for the future development of animal-assisted intervention [14]. While there is increasing research evidence showing the efficacy of animal-assisted intervention to human well-being, under the "One Health", and its extension, the "One Welfare" perspective, the affective state of the animals in AAE and its interconnection with human welfare and environmental inclusiveness should also be of our primary concern. It is a moral responsibility of the practitioner to ensure that the service animals are not harmed or threatened during the intervention process. The welfare of the service animals should be considered as equally important as the client's welfare. In reality, even a practitioner has the intention to protect animal welfare in the intervention process, he/she still needs to be equipped with relevant knowledge to ensure that welfare of

the service animals would not be unintentionally violated. Most of the frameworks in accessing animal welfare in AAE originated from farm animals and guidelines to safeguard these animals in AAE settings vary among organizations. As such, the applicability of these assessment frameworks in school settings appears to be a challenge for practitioners. Presently, there is no gold standard of good practice and policy on animal welfare in AAE; it implies that many current AAE practices rely heavily on 'practice wisdom' [13].

In AAE, ensuring programme fidelity is difficult because human-animal interaction is unique, un-replicable and varied by context. We cannot completely control all behavioural responses of the service animals in practice. Nonetheless, it is possible to instigate an atmosphere that promotes positive human-animal interaction both for the animal and the human to achieve the intended outcomes. Implementing AAE in Hong Kong might be even more challenging because of the citizens' stereotypes on animals, animal unfriendly city design and policies. Therefore, this paper illustrates the methods and principles adopted by a multidisciplinary team in developing a protocol and steps taken for effective implementing of an AAE project in Hong Kong.

Implementation of animal-assisted humane education

The implementation flow and important capstone of conducting CARing Kids in different stages (before, during and after the intervention) in Hong Kong primary school setting were outlined in (Figure 1).

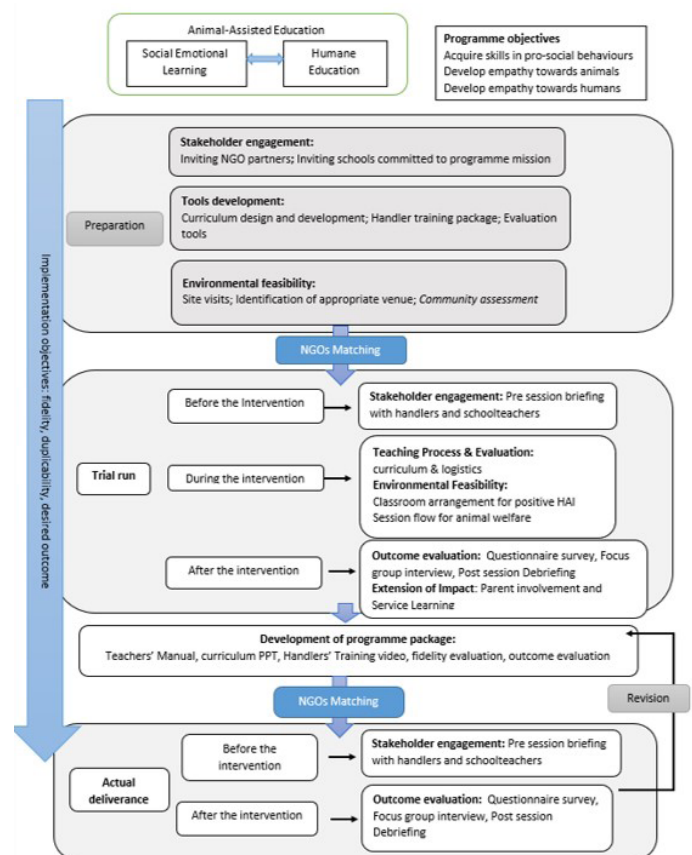


Figure 1: Flow diagram of Implementing CARing Kids in Primary School Setting.

Preparation phase

Jones and Bouffard [18] suggested that the outcomes of a social-emotional intervention can be affected by the classroom context, culture, and community climate. Those factors impact

the effectiveness of AAE in a relatively significant level; it is because not only children are affected, the service canines, which are more sensitive to environmental cues, will also be affected. The following procedures were taken to create a context within which AAE is conducted with due considerations in protecting the welfare of the service canine as well as achieving programme effectiveness.

Stakeholder engagement

Organizational leadership is a crucial factor to determine the successfulness of an intervention [19]. The first level leader of an organization can facilitate change and innovation, thus critical to intervention effectiveness and sustainability [20]. A supportive school principal and fellow teachers are essential for the implementation of a new programme in the education setting.

A kick-off event was organized to identify interested schools committed to the programme goals. To promote and publicize the mission behind the programme, airtime in media such as radio, television, newspaper was solicited. Many schools have contacted the research team and showed interest in implementing CARing Kids programme in their schools. Meetings were arranged with interested schools to facilitate a better understanding of the programme. Six schools that shared a vision of pro-animal attitude in education, and willing to sustain the CARing Kids programme at their schools were recruited and implemented the programme in 2019-20 academic year. Apart from the schools, we also engaged non-governmental organizations who could recruit service canines to support the implementation of CARing Kids. In total, four NGOs providing service of animal-assisted intervention were recruited for this programme. All recruited NGOs have their system of training, assessment standards and accreditation for the service canines to ensure the safety and service quality.

Tools development: Competence in Active Resilience for Kids (CARing Kids) curriculum

CARing Kids is the first animal-assisted humane education for children in Asia developed by a multidisciplinary team including academic, psychologist, social worker, and animal-assisted therapists. CARing Kids included the essential elements of Social-Emotional Learning (SEL) programme such as environmental literacy, social-emotional competence, empathy, and interpersonal problem-solving skill to support the all-rounded social-emotional development of children. Besides, to facilitate the development of a humane attitude, animal friendliness and reading motivation, CARing kids included a canine companion reading component in every session. Six storybooks based on real dog stories in Hong Kong with the SEL themes (e.g. empathy, emotional management, problem-solving, social skills, coping with adversity) were created for the canine companion reading. The basic structure of the CARing Kids is shown in Table 1 below.

Table 1: Structure of the Teaching Plan of CARing Kids.

Content distribution of each session	Estimated duration
Introducing theme and session objectives	5 mins
Mini lecture	20 mins
Canine companion reading	25 mins
Revision on the theme of the session	10 mins

Two basic principles: Welfare and evidence

The design and implementation of CARing Kids follow two major principles. First, the practitioner shall use their best efforts to safeguard the welfare of both service canines and participants. Second, the implementation process must be objectively evaluated to generate practice-based evidence to justify the adaptation of the programme and further development of AAE. CARing Kids aims to cultivate the children's humane attitude, and the children often learn through the observation of the behaviour of others [21]. The practitioner is not only a knowledge distributor but a role model for students to learn about humane attitudes. To ensure adequate measure to protect animal welfare, international guidelines such as the 'Five Freedoms of Animals' and code of ethics regarding therapy animal were strictly adhered to [22,23]. Besides, the practitioner shall guarantee the welfare of all parties in the intervention. Both the cost and impact of the animal-assisted intervention should be taken into consideration. If the intervention creates a stressful situation for the service canines, the meaning of humane education is defeated.

Need and feasibility assessment: Site visit

The site visit serves two significant purposes; first, to obtain the necessary information of the participating schools, including students' background and needs, school policies, and the physical facilities to conduct an AAE programme. Second, it helps the research team to understand the expectation of schools, to set up realistic goals as well as feasible implementation strategies. During the site visit, the research team met the stakeholders (including school principals and teachers) in person, to explain the curriculum in detail and to have a mutual understanding on how the school could accommodate the curriculum requirements. The expectations of a close working relationship were clearly stated. Moreover, the practitioner should ensure the school facilitates are adequate and safe for conducting the AAE sessions. CARing Kids is a class-based intervention with the service canines. It requires extra room space and facilities. The site visit helps to locate the most suitable venue for carrying out the CARing Kids sessions within the school. The research team assesses three aspects of physical venues; a) size of venue for activities with service canines; b) the arrangements in the entrance and exit for the service canines; and c) arrangement of transportation for the service canines to arrive at the schools.

Limited parking space in Hong Kong

Parking space is a distinctive need under the context of Hong Kong when compared with AAE programmes in other countries. Most of the public transports in Hong Kong do not allow any animals (except for guide dogs). Taxis may allow passengers to take their domestic animals at the driver's discretion, but there is still a huge possibility that they might refuse to do so. Thus, some handlers would prefer to use their own vehicle to bring the service canine to school. The practitioner needs to check if parking lots are available.

Community assessment

Community walk is a common technique often adopted in a social work setting to assess community resources [24]. In AAE, the community walk serves two purposes. First, assess the area on animal friendliness and foresee the transportation route for the service canines to arrive at the schools. Hong Kong ranked the 5th most densely populated city in the world [25]. Some schools are locate near thigh traffic areas or in government

subsidized public housing where service canines are prohibited. A safe route can ensure the service canines attend the session without undue stress en route and avoid physical injuries. Second, community walk helps to assess the neighbourhood perception of animals. Since companion animal ownership in Hong Kong is relatively lower than their international counterparts, the acceptance to seeing a service canine in the vicinity varied.

NGOs matching

Only certified service canines were engaged to participate in the CARing Kids; all have passed the assessment on temperament, response to other animals and strangers [26]. Apart from temperament assessment, official records on regular vaccination is mandatory to minimize the risk of zoonosis. After obtaining information, the research team facilitated a NGO-school match in terms of practical considerations such as handlers' preferences and commitments, availability of parking space etc. matches the service animal NGOs with the school. The primary purpose in facilitating a NGO-school match is: 1) to encourage the development of a stable bonding between the services canine and the students and 2) to establish a stable working relationship between a particular NGO and school for programme sustainability. The principle of matching is that, as far as possible, the same service canines would serve all the six-sessions in the curriculum per semester per school.

Trial run phase

The trial run phase aims to implement CARing Kids on a small scale to examine both positive and negative impacts. The results obtained in the trial run phase would be used to formulate a set of guidelines and curriculum packages for the standardized implementation of CARing Kids.

Before the intervention: stakeholder engagement

After the NGOs were selected, training session were conducted to ensure the service animal handlers understand the characteristics of the participants and prepare the service canines for the programme. A briefing video and actual training were prepared by the animal-assisted therapist and psychologist from the research team. The video was on knowledge handlers should equip mock before joining the sessions. The research team had organized a mock session with 11 children for our handlers to familiarize with the rundown of a CARing Kids session.

Prior notification to participants, parents, teachers, and insurance

The teachers in the schools and parents of the participants were notified well in advance about the participation of service canines in the programme. This was taken as a special precaution because most of the citizens, especially children, have limited chances to interact with a live animal at school. Some of the students, teachers, and parents might be afraid of canines; prior notification could reduce the risk of unwilling encounter within the campus before or after the intervention. To further ensure the safety of both parties, a specific insurance policy on service canine activities was secured for public liability.

During the intervention

AAE, like any other education intervention, is a dynamic and spontaneous process. Even though strategies to increase programme effectiveness and risk reduction have been put in place during the preparatory stage, the process in intervention may

directly impact the program efficacy. Several aspects should be taken into account during the implementation process.

Teaching process and evaluation

The structure of each lesson was described in Table 1. The following components were considered in the practice of CARing Kids to ensure teaching effectiveness.

Teaching manual and activities preparation

A detailed intervention protocol could ensure programme effectiveness and fidelity. The teaching manual and activities plan of CARing Kids were prepared and explained to the teachers and handlers before every session. It helps to ensure the teachers and handlers can arrange facilities for the welfare of service canines and participants. Prior notice of the teaching activities can also facilitate the involvement of handlers, most importantly, the handlers can be involved in the lesson planning and help to refine the teaching plan from an animal welfare perspective.

Preparation for first human-animal interaction

Handlers and the service canines would arrive 10 minutes before the session to familiarize with the environment. The service canines and the handlers usually sat at the back of the room as far away as possible from the students, facing their back throughout the session. This seating plan helped the service canines to calm down and ensure that the environment does not cause any unnecessary stress to our service canines. Students and teachers came into the room after our service canines were settled down in the reading corner, as indicated in Figure 2a. This arrangement was to maximize space for the service canines and minimize opportunities for disturbance during the lesson. The only time students would approach the service canines or handlers was during the canine companion reading. Since most students did not have prior experience of interacting with canines, the instructor needed to educate the students the proper way to interact with service canines. A stuffed animal toy was used in the "guided practice" to address the anxiety of participants before actual interaction with service canines. Using stuffed animals could benefit the human-animal interaction in two aspects. First, the participants could learn the proper way of interacting with service canines in a hypothetical and relatively stress-free situation. Second, the instructor could correct participants' certain behaviours which might cause stress to the service canines. Our experience suggested that using the stuffed animal toys for demonstration is useful in activities that require intense and direct interaction with the service canines. Participants responded more confidently during the engagement activity, the stable and precise body movement of students could increase the success rate of forming positive bonding with service canines.

Fidelity evaluation

Fidelity evaluation is a measure to ensure the delivery of an intervention adheres to the curriculum. It is also an essential component for promoting evidence-based instructional practices (EBIPs), which is inevitable in educational settings [28]. Factors including the class size, classroom setting, and method to present the curriculum would impact the efficacy and effectiveness of an intervention. Fidelity evaluation can increase significance for outcome evaluation, treatment effectiveness, and service administration. [29]. Fidelity evaluation has been extensively investigated in STEM education for more than two

decades [30]. In CARing Kids, a fidelity checklist was prepared to record and assess the delivery of each session. It helps the instructor to reflect the teaching process and explore better implementation strategies.

Environmental feasibility

Effective antecedent strategies are critical in enabling a positive learning experience for the students [31,32]. The literature on animal-assisted intervention and animal welfare suggested that the environment in which these animals served shall be managed carefully to ensure their physical and psychological well-being [33,34]. Studies also found a negative association between age of the recipients and stress-related behaviour of the animals in AAE [33,35]. Given the age of the students in this project are generally 8 to 10 years old, careful planning in classroom management and its execution become even more critical. An exemplary configuration of the venue is essential to implement CARing Kids. It is because handling a group of 30 students and service canines are challenging and might require additional effort to ensure the programme effectiveness and welfare of both parties. The school has been briefed in advance on physical precautions to ensure animal welfare, e.g. suitable room temperature, clean and hygienic venue, and noise-free environment. We requested the school not to use stimulating laundry detergent or concentrated bleach to clean the venue before the intervention to avoid chemical stimulus to service canines [36,37]. Besides, on the day of the session, the research team first transformed the venue into the settings shown in Figure 2a and Figure 2b. This setting aims to give adequate space for both students and service canines to settle down. Carpets were included in the reading corner, which serves three purposes; first, it prevents the service canines from getting injured, because the floors of primary school venues were often slippery for canines; second, it provides a sense comfort to the service canines in companion reading; third, it serves as a visual cue for the students to distinguish the reading area and avoid the overcrowded situation that causes unnecessary stress on service canines.

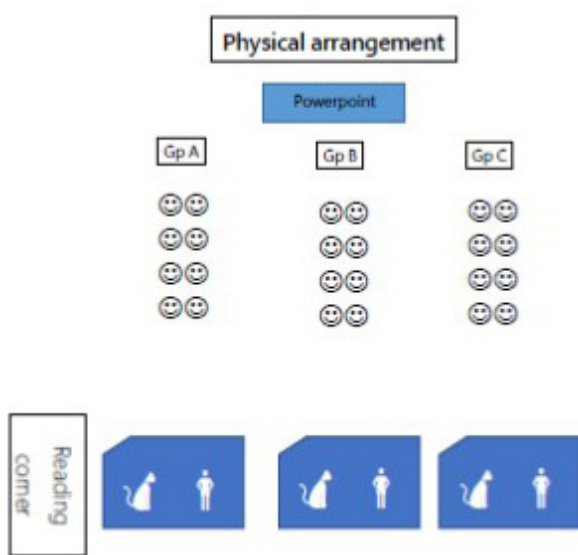


Figure 2a: The Classroom Arrangement of CARing Kids.

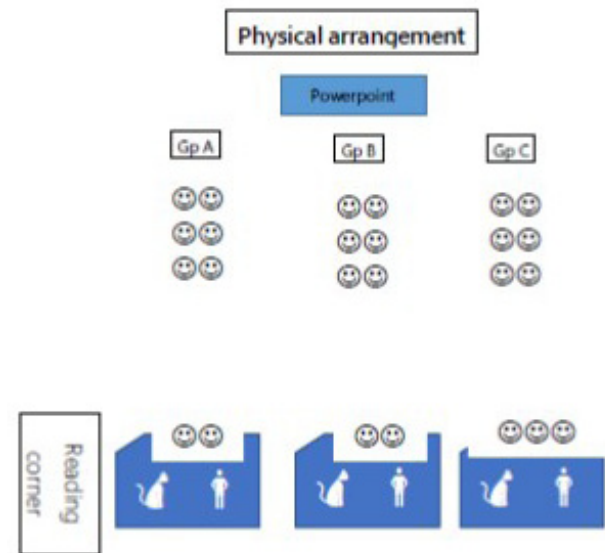


Figure 2b: Change of Setting in canine companion reading activities.

Evaluation on service canine stressor and animal welfare

To safeguard the welfare of service canines, we aim to identify the patterns in their stress-related behaviors and the potential factors associated. Three members from the research team have received training on ethogram from an animal expert in the School of Veterinary Medicine and Life Sciences. After reviewing current literature on stress-related behaviour elicited by service canines while participating AAE, we had developed a pilot coding list comprised of an ethogram for service canines' behaviours and a list of CARing Kids participants' behaviours. Stress-related behaviors, such as panting, restless, scanning, inspecting, are coded for evaluating the stress level of service canines.

After the sessions

A practitioner should not only focus on the teaching process of AAE. We should also be aware of the arrangement after each session to ensure the all-round welfare of service canines and the long-term efficacy of the intervention.

Outcome evaluation

The research team led a debriefing session after each session to seek comments for ongoing improvements. All stakeholders, including the research team, teachers, and handlers, were invited to evaluate the session together. Comments were received from teachers regarding the method of delivery by the instructor and the design of teaching materials. This multidisciplinary session evaluation aims to improve implementation effectiveness. School teachers proposed implementation adaptation for effective teaching in primary students.

On the other hand, handlers shared their experiences in canine companion reading, such as seating arrangement, quality of human-canine interaction and issue related to animal welfare. Moreover, observations on changes in intended outcomes among students throughout the programme were discussed during the debriefing sessions. Besides, three waves of questionnaires were collected from the students, parents and teacher, before, after one week, and four weeks of the curriculum completion to track their latent development of social and emotional learning. Students, teachers and parents focus groups were then conducted to obtain information further to

understand the underlying mechanism of the students' changes.

Extension of impact

After-class activity is an essential aspect of ensuring the impact and sustainability of learning outcomes. Jones, Brush [38] indicated that the family and community engagement are two standard components in SEL programme. CARing Kids tried to extend the impact through increasing parent involvement and service-learning.

Parent involvement

Family is the primary social context for children. Ma, Shen [39] indicated a strong relationship between parental involvement and student learning outcomes; the role of parents was more important than the roles of schools and communities in early elementary school education. The education department of the United States even recommended the participation of parents in "regular, two-way, and meaningful communication in school activities" [40]. In CARing Kids, we believed that parent involvement is essential in children development of social and emotional skills and humane attitudes. We, therefore, included several components that aim to increase parent involvement. First, a letter was distributed to the parent after each session to inform them about the curriculum content and suggested extended home activities. Second, we encouraged the children to borrow the picture books (in CARing Kids) and read to their family members. Each picture book included a reading guide to facilitate parent-child discussion on underlying meaning of the stories. These components enable parents to have an in-depth involvement of children social and emotional development.

Service-learning to sustain learning outcomes

Service-learning could improve students' understanding of the course materials [41]. Since most of the extant studies focus on college students, school teacher's opinions are important for the design of service-learning activities in the primary school setting. The community walk mentioned in the previous section provided valuable information for designing community service. Service-learning is a unique element of this programme to strengthen students' understanding of the messages delivered through CARing Kids and encourage them to apply the knowledge into daily life. The research team would customize a service-learning activity for the schools after the six regular lessons. So far, two different service-learning formats for the participating schools were designed. One was called "after-class challenge". We have invited the students to complete tasks related to our SEL themes of different sessions in everyday life for four weeks. Teachers scored the challenges completed by the students, and they received a sticker for each completed task. The stickers were converted into donations for dogs waiting for adoption at a local animal rescue centre. Students then shared their personal experiences of completing the tasks during a sharing session. The local animal rescue centre was also invited to deliver a speech on humane education with their dogs that were waiting for adoption. Most importantly, the local animal rescue centre thanked the students for saving a life by performing the tasks and shared the updated status of the dogs that they have helped. Another example of service-learning was to organize a one-off activity and invited students who have joined CARing Kids to perform a trial session in front of their fellow senior year students and parents. The students demonstrated how to interact with service canines and demonstrate the ca-

nine companion reading in the trial session. The senior year students then tried to greet and read to our reading dogs after the demonstration. The result is desirable as some senior students expressed their interests to join CARing Kids after the trial session.

Development of programme package

After obtaining the data and practical implementation experience, the research team refined the curriculum activities, the content of the teacher's manuals, handlers' training video, fidelity and outcome evaluation tools. A comprehensive and culture-sensitive programme package focused on the all-rounded aspect of the effectiveness, efficacy, welfare, feasibility of animal-assisted humane education was formulated.

Actual deliverance phase

In the actual implementation phase, the instructor can follow the flows and guidelines of the programme package. However, the research team were responsible for two crucial processes, stakeholder engagement and outcome evaluation. These two components can keep the research team be informed about the implementation and outcome of CARing Kids in different school settings. The data obtained in the actual deliverance phase would be evaluated in every academic semester for the further revision of CARing Kids.

Discussion

"One World, One Health, One Welfare" have illustrated the closely related interdependent relationship among human, animal and environment. Education is the main channel to disseminate the concept [9]. The one health education often put extra effort and resources on higher education levels because of the complexity. Nonetheless, pro-environmental and humane attitude should be cultivated since early childhood. CARing Kids, therefore, was introduced in the primary schools. So far, the result of CARing Kids appeared to be favourable. However, our practice experience seem to suggest that several peripheral factors might impact the implementation and sustainability of the programme.

Teachers' humane attitude and knowledge

Fung and Zhou [42] indicated teachers' humane attitudes are considered a prerequisite of humane education success in school settings, and teachers in Hong Kong have a moderate level of humane attitude, suggests the need of teacher training for the efficacy of humane education. In AAE, it requires not only the attitudes of the teachers but also the skills and knowledge about the service canines. Lack of understanding of canine stress response might jeopardize animal welfare and eventually threaten the participants' safety and programme effectiveness. Therefore, training teachers in observing the stress signals of service canines is the necessary process to ensure the sustainability of responsible and welfare concerned animal-assisted humane education.

Education policy and sustainability issue

Education policy affects the sustainability of a programme. Humane education is not a mandatory component in primary school education. Given the novelty of the CARing Kids, how the schools categorized it and embedded it into the existing education system was crucial to determine the resources being allocated to the programme implementation. For example, some schools considered CARing Kids as an extracurricular ac-

tivity while others would categorize it under life or moral education. Reviewing the history of humane education, it appears that one of the reasons to ensure the programme sustainability is the institutionalization; teachers often considered the non-compulsory subject as non-essential and often overlooked its value on student development [43]. In reality, the education policy will impact the implementation of the curriculum in a more direct way. For example, amid the COVID-19 pandemic, all extra-curriculum activities within schools were temporarily suspended under the government policy, while life education lessons were unaffected.

Throughout the last decades, increasing studies have indicated the positive impact of the AAE, especially for its calming and social-emotional impact on children with special education needs [2,44,45]. With the growing quantities of research evidence, the development of AAE shall come to transition stages, from obtaining the research evidence to transferring the research evidence into actual practice. In this transition stage, it requires cooperation from both practitioner and researcher to ensure the quality of the intervention and its delivery. In addition to the efficacy and effectiveness, we should pay special attention to animal welfare, which was often ignored or mistakenly executed. We considered that animal welfare as the primary principle of animal-assisted humane education, not only it is a professional and ethical obligation, but our attitude to the service animal would become the role model of the child participants, thus impacting the outcome of humane education. One of the main challenges to ensure the animal welfare and programme effectiveness is that programme designer or teachers did not have professional training to understand the stress response of the service canines. This study, therefore, aims to outline feasible protective procedures based on the implementation of CARing Kids, and to ensure both animals welfare and programme effectiveness were adequately addressed.

Conclusion

Humane education, teaching for kindness and empathy, have been received diminishing attention since the 1940s because of the global social reform. Nations prefer rigour and toughness rather than empathetic and kind individuals [43]. Humane education has an ambiguous position in the education system in Hong Kong. Educating the next generation about respect and appreciation to nature is vital; however, it seems ineffective to invest resources to cultivate a pro-environmental attitude in this highly urbanized and economically driven era. With the consideration of the increasing rate of urbanization, deterioration of water quality, air pollution in megacities, the distinction of wild animals, and the frequent outbreak of vector-borne disease and virus pandemic, we believe humane education is the essential aspect of the education system to sustain the future development of humanity. The core concept of humane education, which is teaching children kindness toward animals, environment and fellow humans, is not a novel idea, and its origin can be traced back to 1900s [46]. However, the outbreak of zoonosis and the deterioration of the environment in the last two decades remind us of the importance of this old concept in human development [47]. As mentioned previously in the introduction, the WHO considered education as essential to promote the "One Health Concept". Apart from the cognitive understanding of the relationship between human and nature, the humane attitude is a building block for the individual to learn and implement knowledge of "One Health". While increasing works of literature started to indicate that positive human-

animal interaction can promote social-emotional competence (i.e. empathy and prosocial behaviours), we shall consider how to transfer the research results in the real-life implementation, and most importantly, ensuring the service animals were treated humanely during the implementation. Increasing education practitioner started to appreciate the impact of human-animal interaction and was willing to embed AAE in their teaching. Furthermore, CARing Kids is not purely an AAE curriculum. The research team aims to develop a self-refining system among researcher and teacher to promote evidence-based animal-assisted humane education. By promoting the practical animal welfare guidelines, scientific process evaluation strategies, and strong cohesion between school, university and NGOs, the research team can periodically review the implementation process and effectiveness of CARing Kids and practitioners' feedback in Hong Kong context and further revise the curriculum to suit the students' need in this metropolis. We hope that our experience in CARing Kids could shed light on how to conduct an effective and AAE in a primary school setting in the metropolis.

References

1. World Health Organization. The World Health Report. 2000.
2. Ahmed S, Davila JD, Allen A, Haklay MM, Tacoli C, et al. Does Urbanization Make Emergence of Zoonosis More Likely? Evidence, Myths and Gaps. *Environ Urban*. 2019; 31: 443-460.
3. Klohe K, Amuasi J, Kaducu JM, Haavardsson I, Bogatyreva E, et al. The 2017 Oslo Conference Report on Neglected Tropical Diseases and Emerging/Re-Emerging Infectious Diseases-Focus on Populations Underserved. *Infect Dis Poverty*. 2019; 8: 40.
4. Liang W, Yang M. Urbanization, Economic Growth and Environmental Pollution: Evidence from China. *SUSCOM*. 2019; 21: 1-9.
5. McKinney ML. Effects of Urbanization on Species Richness: A Review of Plants and Animals. *Urban Ecosyst*. 2008; 11: 161-176.
6. Turan M, Beşirli A. Impacts of Urbanization Process on Mental Health. *Anadolu Psikiyatri Dergisi*. 2008; 9: 238-243.
7. Capaldi CA, Dopko RL, Zelenski JM. The Relationship between Nature Connectedness and Happiness: A Meta-Analysis. *Fron Psychol*. 2014; 5: 976-976.
8. Amuasi JH, Lucas T, Horton R, Winkler AS. Reconnecting for Our Future: The Lancet One Health Commission. *Lancet*. 2020; 395: 1469-1471.
9. Haxton E, Lindberg A, Troell K, Redican KJ. One Health Education Meets Science. *Infect Ecol Epidemiol*. 2015; 5: 30264-30264.
10. Faver CA. Seeking Our Place in the Web of Life: Animals and Human Spirituality. *Journal of Religion & Spirituality in Social Work: Social Thought*. 2009; 28: 362-378.
11. Arkow P. Animal-Assisted Interventions and Humane Education: Opportunities for a More Targeted Focus. *Handbook on Animal-Assisted Therapy*. 2010: 457-480.
12. Brelsford V, Meints K, Gee N, Pfeiffer K. Animal-Assisted Interventions in the Classroom: A Systematic Review. *Int J Environ Res Public Health*. 2017; 14: 669.
13. Brelsford V, Dimolareva M, Gee N, Meints K. Best Practice Standards in Animal-Assisted Interventions: How the Lead Risk Assessment Tool Can Help. *Animals*. 2020; 10: 974.
14. Fine AH, Beck AM, Ng Z. The State of Animal-Assisted Interventions: Addressing the Contemporary Issues That Will Shape the

- Future. *Int J Environ Res Public Health*, 2019. 16.
15. Durlak J, DuPre E. Implementation Matters: A Review of Research on the Influence of Implementation on Program Outcomes and the Factors Affecting Implementation. *Am. J. Community Psychol.* 2008; 41: 327-350.
 16. Lendrum A, Humphrey N. The Importance of Studying the Implementation of Interventions in School Settings. *Oxf. Rev. Educ.* 2012; 38: 635-652.
 17. Herrera-Sánchez IM, León-Pérez JM, León-Rubio JM. Steps to Ensure a Successful Implementation of Occupational Health and Safety Interventions at an Organizational Level. *Fron. Psychol.* 2017; 8: 2135-2135.
 18. Jones SM, Bouffard SM. Social and Emotional Learning in Schools: From Programs to Strategies and Commentaries. *Social Policy Report.* 2012; 26: 1-33.
 19. Aarons GA, Ehrhart MG, Farahnak LR, Hurlburt MS. Leadership and Organizational Change for Implementation (LocI): A Randomized Mixed Method Pilot Study of a Leadership and Organization Development Intervention for Evidence-Based Practice Implementation. *IMPLEMENT SCI.* 2015; 10: 11.
 20. Priestland A, Hanig R. Developing First-Level Leaders. *Harv Bus Rev.* 2005; 83: 112-120.
 21. Zimmerman BJ, Rosenthal TL. Observational Learning of Rule-Governed Behavior by Children. *Psychological Bulletin.* 1974; 81: 29-42.
 22. Preziosi R. For Your Consideration: A Pet-Assisted Therapy Facilitator Code of Ethics. *Journal. The Latham Letter.* 1997.
 23. UK Farm Animal Welfare Council. Five Freedom. 1979.
 24. Holland S, Burgess S, Grogan-Kaylor A, Delva J. Understanding Neighbourhoods, Communities and Environments: New Approaches for Social Work Research. *Br J Soc Work.* 2010; 41: 689-707.
 25. World Population Review. Countries by Density by Population 2020. 2020.
 26. Sandt DD. Effective Implementation of Animal Assisted Education Interventions in the Inclusive Early Childhood Education Classroom. *Early Child. Educ. J.* 2020; 48: 103-115.
 27. Fine AH. Incorporating Animal-Assisted Therapy into Psychotherapy: Guidelines and Suggestions for Therapists, in *Handbook on Animal-Assisted Therapy (Third Edition)*, A.H. Fine, Editor. 2010; 169-191.
 28. Hall GE, Loucks SF. A Developmental Model for Determining Whether the Treatment Is Actually Implemented. *Am. Educ. Res. J.* 1977; 14: 263-276.
 29. Mowbray CT, Holter MC, Teague GB, Bybee D. Fidelity Criteria: Development, Measurement, and Validation. *Am. J. Eval.* 2003; 24: 315-340.
 30. Penuel WR, Means B. Implementation Variation and Fidelity in an Inquiry Science Program: Analysis of Globe Data Reporting Patterns. *J Res Sci Teach.* 2004; 41: 294-315.
 31. Banks T. Creating Positive Learning Environments: Antecedent Strategies for Managing the Classroom Environment & Student Behavior. *Creat. Educ.* 2014; 5: 519-524.
 32. Kern L, Clemens NH. Antecedent Strategies to Promote Appropriate Classroom Behavior. *Psychol. Sch.* 2007; 44: 65-75.
 33. Glenk LM. Current Perspectives on Therapy Dog Welfare in Animal-Assisted Interventions. *Animals (Basel).* 2017; 7.
 34. Ng ZY, Pierce BJ, Otto CM, Buechner-Maxwell VA, Siracus C, et al. The Effect of Dog-Human Interaction on Cortisol and Behavior in Registered Animal-Assisted Activity Dogs. *Appl Anim Behav Sci.* 2014; 159: 69-81.
 35. Marinelli L, Normando S, Siliprandi C, Salvadoretta M, Mongillo P. Dog Assisted Interventions in a Specialized Centre and Potential Concerns for Animal Welfare. *Vet Res Commun.* 2009; 33: 93-95.
 36. Banovic F, Olivry T, Baumer W, Paps J, Stahi J, et al. Diluted Sodium Hypochlorite (Bleach) in Dogs: Antiseptic Efficacy, Local Tolerability and in Vitro Effect on Skin Barrier Function and Inflammation. *Vet Dermatol.* 2018; 29: 6-e5.
 37. Muggenburg BA, Mauderly JL, Hahn FF, Silbaugh SA, Felicetti SA. Effects of the Ingestion of Various Commercial Detergent Products by Beagle Dogs and Pigs. *Toxicol Appl Pharmacol.* 1974; 30: 134-148.
 38. Jones SM, Brush K, Bailey R. Navigating Sel from the inside Out: Looking inside & across 25 Leading Sel Programs: A Practical Resource for Schools and Ost Providers: (Elementary School Focus). 2017.
 39. Ma X, Shen J, Krenn HY, Hu S, Yuan J. A Meta-Analysis of the Relationship between Learning Outcomes and Parental Involvement During Early Childhood Education and Early Elementary Education. *Educ Psychol Rev.* 2016; 28: 771-801.
 40. Albright MI, Weissberg RP, Dusenbury LA. *Book School-Family Partnership Strategies to Enhance Children's Social, Emotional, and Academic Growth.* MA: National Center for Mental Health Promotion and Youth Violence Prevention, Education Development Center, Inc. 2011.
 41. Prentice M, Robinson G. Improving Student Learning Outcomes with Service Learning. *High Educ.* 2010; 148.
 42. Fung SC, Zhou S. An Investigation of Pre-Service Teachers' Attitudes toward Animals and Empathy toward Humans: Implications for Humane Education Development. *Anthrozoös.* 2020; 33: 415-426.
 43. Unti B, DeRosa B. *Humane Education Past, Present, and Future, in The State of the Animals li, D.J. Salem and A.N. Rowan, Editors.* 2003, Humane Society Press: Washington, DC.
 44. Beetz A, Julius H, Turner D, Kotrschal K. Effects of Social Support by a Dog on Stress Modulation in Male Children with Insecure Attachment. *Front Psychol.* 2012; 3: 352.
 45. Beetz A, Kotrschal K, Turner DC, Hediger K, Uvnas-Moberg K, et al. The Effect of a Real Dog, Toy Dog and Friendly Person on Insecurely Attached Children During a Stressful Task: An Exploratory Study. *Anthrozoös.* 2011; 24: 349-368.
 46. Atlas RM. *One Health: Its Origins and Future.* *Curr Top Microbiol Immunol.* 2013; 365: 1-13.
 47. Mackenzie JS, Jeggo M. The One Health Approach-Why Is It So Important? *Trop Med Infect Dis.* 2019; 4: 88.