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# Uses of Animals and Alternatives in Pre-college Education in the United States: Need for Leadership on Educational Resources and Guidelines

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**Summary** — Throughout pre-college education in the United States, animals, animal specimens and animals as a topic are used as teaching resources. Residential or visiting pets play a role in humane education or cross-curricular instruction. Teachers acquire and utilise non-living specimens gathered from various sources. Field trips often are oriented around animals. Elementary school animal use is largely observational; in intermediate grades, animal dissection may be featured in general science instruction. At the higher grade levels, animals may be used in science fair projects in an experimental sense. Particularly appealing to teachers is that throughout these uses, animals motivate students. The uses of animals in classrooms reflect the teachers' interests. In the United States, the use of animals in pre-college instruction is not regulated, leading sometimes to inappropriate use. At the University of California, Davis, a pilot programme is assessing curricula, resources and a model prototype to provide administrative guidance on the use of animals in pre-college education. Appropriate animal use would be enhanced by: providing information resources with efficient links to obtaining educational materials; and establishing guidelines for animal use in pre-college education to ensure the animals' welfare. A web-based tool provides access to resources ([www.vetmed.ucdavis.edu/Animal\\_Alternatives/main.htm](http://www.vetmed.ucdavis.edu/Animal_Alternatives/main.htm)).

**Key words:** *alternatives, animal use, elementary education, regulation.*

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## Introduction

Among the animals used institutionally for research, teaching and testing, a relatively small proportion are used in education. Animals can play a central role in facilitating the humane education of children, developing their empathy, helping them understand biology and motivating them to learn more about animals. Many effective learning tools exist for biology that do not require a consumptive use of animals, and the technology is available to create a more comprehensive array of such non-consumptive educational resources that are designed to complement the science instructional frameworks for each grade level. In this paper, we focus particularly on elementary education and propose two goals for pre-college science education in the USA. The first is to launch a major initiative for excellence in pre-college humane and biological education that provides convenient and accessible resources designed to facilitate learning. The second is to provide model guidelines to support responsible care and to provide administrative oversight for animals in pre-college instruction. Such guidelines could initially be adopted pro-actively on a voluntary basis. These two goals are achievable and, if implemented, would demonstrate a growing

commitment of the scientific and educational community toward improving animal care.

## Background

The use of animals in education has been a growing focus of attention since the 1980s. Animals in schools provide educational benefits that are summarised below from a coalition report of the Association for Science Education, the Institute of Biology and the Universities Federation for Animal Welfare in the UK (1). Animals provide opportunities for detailed observation of the behaviour, function, structure and life cycles of animals. They facilitate social education on reproduction, social interactions and death. They motivate students to study animals and to acquire skills of literacy and numeracy in that process. Animals provide opportunities for developing aesthetic appreciation through creative work. Animals also are a context for studying environmental factors and assuming responsibility for animal welfare and caring. Coinciding in time with the 1986 report in the UK was legislation that precluded conducting any painful procedures on animals in elementary and secondary schools: "Procedures likely to cause pain,

suffering, distress or lasting harm may not be performed on living vertebrate animals in school. Licences are issued only for education and training otherwise than in primary and secondary schools" (2). This policy sharply contrasts with that in the USA (3). The default in the USA is that the use of animals in pre-college education remains unregulated: "School laboratories — elementary, secondary, and all other schools below the college level are by law exempt from registration" and "Institutions using only biologic specimens — If only dead biologic specimens — no live animals — are used, an institution is exempt" (4). On the other hand, the use of animals for teaching in university and professional settings is regulated, requiring that teaching procedures involving the care and use of animals are reviewed by an institutional oversight committee for compliance with nationally accepted standards (5).

A thoughtful discussion from a Working Party of the Institute of Medical Ethics in the UK on the ethical considerations in the use of animals in education and training emphasised that "in education and training, animals are used . . . to teach or demonstrate known facts, ideas or techniques" (6). This report expressed concern regarding the adequacy of husbandry and general care of animals in elementary schools. Regarding secondary schools, concerns focused on the methods of euthanasia, the dissection of animals, the standards of handling and husbandry, the teaching about the use of animals, and particularly, the use of animals in US schools, especially in science fairs. Another review of policies affecting the use of animals in education, by Barbara Orlans (7), expressed concern regarding animals used in dissection and science fairs in US high schools.

We focus here on the use of animals for education in the USA. Enhancing the availability of resources ultimately can benefit other countries as well, including those with a higher standard of oversight. Implementing standards would communicate and sensitise students to humane treatment of animals, providing them a model for good standards as citizens for their decision-making.

### **Elementary Teaching of Humane Education and Biological Science**

The consumptive use of animals for education, especially the practice of dissection of animals, is the focus of considerable attention (8), leading to the development of lists of alternative resources (9–11). Thus, some information tools for locating teaching resources for use in secondary schools are available. Some materials designed for use in veterinary or undergraduate education are sometimes suitable for use in pre-college instruction (12, 13). Considering the existing resources oriented for sec-

ondary schools, we choose here to emphasise consideration of elementary school teaching of humane education and biological science and to advocate for the teachers' needs for heightened support with resource materials.

Elementary school teachers believe in the educational value of animals and appreciate their motivational qualities. Although teachers incorporate animals into classroom activities, they often lack a formal curricular context for the animals' presence, as found in a study of teachers in Stockton, California (14). In this study, many elementary teachers lacked a science background and felt relatively unprepared. Those with a science background were more likely to increase their emphasis on animals by adopting classroom pets and providing formal instructional activities about animals. Common uses of animals included classroom pets, animals visiting, animal specimens and parts, animals in bulletin boards, posters, films, and videos, and story writing and book reports concerning animals. These teachers sought more resources concerning animals, including: people — trainers, veterinarians and 4-H personnel; places — wetlands, ranches and laboratories; resource materials — specimens, binoculars; and animals — silkworms and insects.

A central difference exists between the teaching of science versus subjects such as reading, writing and arithmetic. For science, laboratory experience, hands-on, is essential. Paper and pencil instruction plus books are not sufficient. Resource materials must be available when they are needed for the particular lesson plan. Acquiring the materials in a timely manner is often costly and inconvenient. From this perspective, biological and humane education in elementary and secondary schools are unsupported. From the national to the local level, there is a lack of a focused administrative commitment sufficient to assure that the resource materials essential to fine instruction are at hand when needed for the lesson plan.

A further lack of administrative involvement is reflected in the lack of standardised guidelines for animal use, i.e. being unregulated. Pro-active principals and superintendents would conceivably desire to adopt a clear set of guidelines that would provide supportive direction to teachers wanting to offer experience with animals to their students and facilitate their knowledge regarding animals, just as managers of housing authorities have found it helpful to have clearly-stated pet policies in public housing (15).

Given that most elementary teachers lack a science background, and that their science teaching is somewhat unsupported, by default, they have the responsibility to acquire knowledge and their own resource materials for effective science teaching. It falls to their creativity and ingenuity to inspire and motivate their students to learn. Since the use of

animals is unregulated and lacks standardised guidelines, the result is an open-ended system where virtually anything goes. In such a case, some uses of animals inevitably are inappropriate and would not withstand scrutiny of a group of professionals and parents.

### **Educational Resources for Humane Education and Biological Science**

Access to convenient sources of information concerning effective educational resources is an essential first step toward improving biological science education. The Norwegian Inventory of Audiovisuals (NORINA) maintains a comprehensive listing of teaching resources on the Web (16, 17). The list is searchable by category and by type of product. Resources for animals in education or science fairs are available on a website of the Animal Welfare Information Center (18). Lists of teaching materials that emphasise alternatives to dissection are available from the Association of Veterinarians for Animal Rights (11) on a searchable website, and in books (9, 10).

A second essential step for teachers is to actually acquire the teaching resources. This is facilitated by several humane organisations that sponsor programmes for loaning teaching resources (19–22). A teacher planning to take advantage of these programmes needs to order materials well ahead and may need to provide a credit card deposit while borrowing the resource.

The University of California (UC) Center for Animal Alternatives (23) emphasises user-friendly resources via the Web and has developed a website on education alternatives that presents these various resources at a single site. Convenient access is facilitated with search templates and web links, simple to use even for someone with little experience using web-based resources: [www.vetmed.ucdavis.edu/Animal\\_Alternatives/main.htm](http://www.vetmed.ucdavis.edu/Animal_Alternatives/main.htm).

### **Goals and Models for Enhancing Education and Animal Care**

Visionary leadership can enhance and carry forward pre-college humane and biological education. Just as comprehensive initiatives have advanced elementary instruction in arithmetic and reading, science education would benefit from a concerted, integrated effort. Such attention has not been riveted on early preparation for science since Russia's launch of Sputnik in 1957. As a first goal, a coalition of scientists, educators, leaders from the pharmaceutical and cosmetic industries, and people concerned for animal welfare could plan, fund and launch such a project.

Existing courses can serve as models for how superb instruction can be built around reusable

specimens. A UC Davis undergraduate course offered by the School of Veterinary Medicine, APC 100, *Comparative Vertebrate Anatomy*, is a good example. Offered since 1991, in its current form, this “course in a drawer” is modelled on the concept of Montessori instruction. It utilises reusable specimens, slides and models specially prepared and collected, including drawing from clinical cases at the School of Veterinary Medicine over past years. For each laboratory on a specific physiological system, approximately thirty unique laboratory stations are assembled and available for a full day of use, and students rotate through the stations during the half-day session. The laboratory is supported with extensive printed and software materials. A similar undergraduate course, CHA101, *Human Gross Anatomy*, is offered by the School of Medicine. The course leader, Professor Douglas Gross, oversees a laboratory providing directed access to human specimens. Similar course units could be developed for lower and middle elementary, junior and secondary grades and equipped with teaching lesson plans, software and plastinated specimens. The use of real human bodies for such education will only increase in the future, given the ground-breaking methods of display and a growing number of human donors worldwide, leading to what Gunther von Hagens (the inventor of plastination) terms the “democratisation” of such biological knowledge (24).

A UC Davis programme, *Animal Ambassadors* (25), can serve as a model for bridging scientific expertise from the college to pre-college level. This programme uses animals as a bridge to learning, developing curricula appropriate to specific instructional levels, and sending well-prepared college students into classrooms to disseminate the materials. This builds enthusiasm for learning science and supports teachers by bringing in well-prepared lesson plans with instructors. Furthermore, the curricula involve no live animals for instruction; activities are made interactive through the use of hands-on materials, including foot molds, tooth molds, and imitation animal coats.

Research on the *Animal Ambassadors* programme with elementary school children shows that it improves children's science process skills, animal-related concept use and understanding, and the perception of their relationship to animals (26). In addition, an associated series of training workshops has been developed to improve the confidence and competence of educators to teach science (27). As a model, the *Animal Ambassadors* programme has the potential to be extended and reach many more classrooms than when simply relying on occasional guest speakers.

A second goal is to initiate guidelines for the care and use of animals in education settings. Although suggested principles and guidelines for the use of animals in pre-college education are available from the Institute of Laboratory Animal Resources (28),

they have not been systematically implemented or used as a basis for protocol review. Also, some organisations have adopted position statements that encourage educators to consider and implement the principles of the Three Rs (29). With a systematic implementation of guidelines, every classroom would then be guided and have administrative support with precise guidelines for the use of animals, provisions for veterinary care, husbandry and, when appropriate, adoption. Such guidelines would initially be adopted on a voluntary basis by interested administrators in formal settings, such as schools or districts, or in informal settings, such as 4-H organisations. Martin Smith (private communication, 2002) is spearheading such an effort at UC Davis, and is chairing a task force with the objective to implement guidelines in some model settings. Steps will include establishing a supervisory committee of administrators, teachers, parents, and a veterinarian. An education protocol form to be prepared for each use of animals is being designed. When filled out, the form would define the need and appropriate species of animal, outline the prescribed care, and clarify the risks and benefits for the particular use.

## Conclusions

The goals of furthering science education are consistent with reducing or eliminating the consumptive use of animals in education and providing a reasoned structure for the responsible use of animals in education. These various goals can be met by establishing more convenient access to teaching resources that are well-integrated with teaching objectives. Exposure to animals plays an important role in meeting educational and motivational objectives, but such exposure should be conducted within a reasoned framework and in accordance with appropriate standardised guidelines that are implemented with administrative support and oversight.

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## References

1. Association for Science Education, Institute of Biology, and Universities Federation for Animal Welfare (1986). The place of animals in education. *Biologist* **33**, 275–278.
2. Home Office (1990). *Guidance on the Operation of the Animals (Scientific Procedures) Act 1986*. London, UK: HMSO.
3. Hart, L.A. (1998). Responsible animal care and use: moving toward a less-troubled middle ground. In *Responsible Conduct with Animals in Research* (ed. L.A. Hart), pp. 3–17. New York, NY, USA: Oxford University Press.
4. US Department of Agriculture (1992/2002). *Licensing and Registration under the Animal Welfare Act: Guidelines for Dealers, Exhibitors, Transporters, and Researchers, Program Aid 1117*, 18pp. Washington, DC, USA: US Department of Agriculture, Animal and Plant Health Inspection Service.
5. US Department of Agriculture (1989). Part IV. Department of Agriculture. Animal and Plant Health Inspection Service, 9 CFR parts 1, 2, and 3. *Animal Welfare; Final Rules, August 31*, pp. 36113–36163. Washington, DC, USA: US Department of Agriculture.
6. Smith, J.A. & Boyd, K.M. (eds). (1991). *Lives in the Balance: The Ethics of Using Animals in Biomedical Research: The Report of a Working Party of the Institute of Medical Ethics*, 352pp. Oxford, UK: Oxford University Press.
7. Orlans, F.B. (1993). *In the Name of Science: Issues in Responsible Animal Experimentation*, 297pp. New York, NY, USA: Oxford University Press.
8. Balcombe, J. (2000). A global overview of law and policy concerning animal use in education. In *Progress in the Reduction, Refinement and Replacement of Animal Experimentation* (ed. M. Balls, A.-M. van Zeller & M.E. Halder), pp. 1343–1350. Amsterdam, The Netherlands: Elsevier Science B.V.
9. Balcombe, J. (2000). *The Use of Animals in Higher Education: Problems, Alternatives, and Recommendations*, 104pp. Washington, DC, USA: Humane Society Press.
10. Zinko, U., Jukes, N. & Gericke, C. (1997). *from Guinea Pig to Computer Mouse: Alternative Methods for a Humane Education*, 229pp. Leicester, UK: EuroNICHE. [N.B. Jukes, N. & Chiulia, M. (2003). *from Guinea Pig to Computer Mouse*, 2nd edition, 544pp. Leicester, UK: InterNICHE.]
11. Association of Veterinarians for Animal Rights (2002). *Alternatives in Education Database*. Website [http://www.envirolink.org/arrs/avar/alted\\_db.htm](http://www.envirolink.org/arrs/avar/alted_db.htm). Vacaville, CA, USA: Association of Veterinarians for Animal Rights (accessed 09.09.02).
12. Computer Assisted Learning Facility (2002). CALF. Website [www.calf.vetmed.ucdavis.edu/calf.html](http://www.calf.vetmed.ucdavis.edu/calf.html). Davis, CA, USA: University of California, Davis (accessed 09.09.02).
13. Zasloff, R.L. & Hart, L.A. (1997). Adapting animal alternatives from veterinary medical education to precollege education. In *Animal Alternatives, Welfare, and Ethics. Developments in Animal and Veterinary Sciences, Vol. 27* (ed. L.F.M. van Zutphen & M. Balls), pp. 445–447. Amsterdam, The Netherlands: Elsevier Science B.V.
14. Zasloff, R.L., Hart, L.A. & DeArmond, H. (1999). Animals in elementary school education in California. *Journal of Applied Animal Welfare Science* **2**, 347–357.
15. Hart, L.A. & Mader, B. (1986). The successful introduction of pets into California public housing for the elderly. *California Veterinarian* **40**, 17–21, 27.
16. Smith, A.J. & Smith, K. (1997). The NORINA database of audiovisual alternatives. In *Animal Alternatives, Welfare, and Ethics. Developments in Animal*

- and *Veterinary Sciences*, Vol. 27 (ed. L.F.M. van Zutphen & M. Balls), pp. 511–515. Amsterdam, The Netherlands: Elsevier Science B.V.
17. Smith, K. & Smith, A. (2002). *NORINA: Norwegian Inventory of Audiovisuals*. Website <http://netvet.wustl.edu/norina.htm>. Oslo, Norway: Laboratory Animal Unit, Norwegian School of Veterinary Science (accessed 09.09.02).
  18. Crawford, T. L. (2002). *Selected Internet Resources for Science Fairs, Animals in Education and Research, Kids Pages and Animal Careers*. Website <http://www.nal.usda.gov/awic/pubs/scifair.htm>. Washington, DC, USA: Animal Welfare Information Center, US Department of Agriculture (accessed 09.09.02).
  19. American Anti-Vivisection Society (2002). *The Science Bank: Education for the Future*. Humane Science Education Products; and Animalearn's lending library. Websites [www.animalearn.org](http://www.animalearn.org), <http://www.aavs.org/Docs/sciencebank.htm>. Jenkintown, PA, USA: Animalearn, American Anti-Vivisection Society (accessed 09.09.02).
  20. The Humane Society of the United States (2002). *Materials Available through HELP*. Website <http://www.hsus.org/ace/13476>. Washington, DC, USA: The Humane Society of the United States (accessed 09.09.02).
  21. National Anti-Vivisection Society (2002). *The Dissection Alternative Loan Program*. Website [http://www.navs.org/education/dissection\\_loan\\_program.cfm?SectionID=Education](http://www.navs.org/education/dissection_loan_program.cfm?SectionID=Education). Chicago, IL, USA: National Anti-Vivisection Society (accessed 09.09.02).
  22. EuroNICHE (1999). *Alternatives in Education: New Approaches for a New Millennium*. Videotape and website [www.interniche.org](http://www.interniche.org). Leicester, UK: EuroNICHE (accessed 09.09.02).
  23. UC Center for Animal Alternatives (2002). *Educational Resources for Teaching: Emphasising Alternatives*. Website [http://www.vetmed.ucdavis.edu/Animal\\_Alternatives/dissection.htm](http://www.vetmed.ucdavis.edu/Animal_Alternatives/dissection.htm). Davis, CA, USA: UC Center for Animal Alternatives, School of Veterinary Medicine, University of California, Davis (accessed 09.09.02).
  24. Von Hagens, G. & Whalley, A. (2002). *Body Worlds — the Anatomical Exhibition of Real Human Bodies*. Heidelberg, Germany: Institut für Plastination.
  25. Animal Ambassadors (2002). *Animal Ambassadors — A Bridge to the World of Science*. Website [http://www.vetmed.ucdavis.edu/vetext/INF-OU\\_AnimalAmbassadors.html](http://www.vetmed.ucdavis.edu/vetext/INF-OU_AnimalAmbassadors.html). Davis, CA, USA: School of Veterinary Medicine, University of California, Davis (accessed 09.09.02).
  26. Smith, M.H., Meehan, C.L., Hamilton, M., Hanna, S., Jonas, R. & Azikiewe, A. (2002). *Outcome Assessment of a Science Education Program in School-based Settings. Summary Data Analysis*. CRESS Large Project Grant, 30pp + appendices. Davis, CA, USA: University of California, Davis, School of Veterinary Medicine, Veterinary Medicine Extension.
  27. Smith, M.H. & Enfield, R.P. (2002). Training 4-H teen facilitators in inquiry-based science methods: the evaluation of a "step-up" incremental training model. *Journal of Extension* **40** (6). Retrieved from <http://www.joe.org/joe/2002december/a3.shtml>.
  28. Institute of Laboratory Animal Resources (2002). *Principles and Guidelines for the Use of Animals in Precollege Education*. Website [http://dels.nas.edu/ilar/prin\\_guide.asp?id=guidelines](http://dels.nas.edu/ilar/prin_guide.asp?id=guidelines). Washington, DC, USA: National Academy of Sciences (accessed 09.09.02).
  29. Society for the Study of Reproduction (2002). *Position Statement on the Use of Animals in Education*. Website <http://www.ssr.org/ssr/uae-stmt.htm>. Madison, WI, USA: Society for the Study of Reproduction.